

CONSEIL DE DIRECTION

Directeur honorifique:

Acad. CONSTANTIN BĂLĂCEANU-STOLNICI

Directeur:

Dr. CRISTIANA-SUSANA GLAVCE

Rédacteur en chef:

Dr. ELENA RADU

Secrétaire:

ANDREI DORIAN SOFICARU

Consultants experts:

Dr. JEROME C. ROSE (Etats-Unis)

Dr. THOMAS CRIST (Etats-Unis)

Prof. univ. ALEXANDRU ISPAS (Roumanie)

Dr. WOLFGANG SCHEFFHRAN (Suisse)

Prof. univ. ALEXANDER RODEWALD (Allemagne)

Prof. univ. HORST SCHMIDT (Allemagne)

Prof. univ. CHARLES SUSANNE (Belgique)

Dr. LIVIU CHELCEA (Roumanie)

Membres:

Dr. CORNELIU VULPE

Dr. MARICICA BULAI-ȘTIRBU

Dr. ANA ȚARCĂ

Rédacteur:

MONICA STANCIU

Informatique éditoriale:

CĂTĂLINA RADU

Toute commande sera adressée à:

EDITURA ACADEMIEI ROMÂNÊ, Calea 13 Septembrie nr. 13, Sector 5, P.O. Box 5-42, București, România, RO-050711, Tel. 4021-318 8146; 4021-318 8106; Fax 4021-318 2444; E-mail: edacad@ear.ro

RODIPET S.A., Piața Presei Libere nr. 1, Sector 1, P.O. Box 33-57, București, România, Tel. 4021-318 7000; 4021-318 7001; Fax 4021-318 7002; 4021-318 7003; E-mail: rodipet@rodipet.ro

ORION PRESS IMPEX 2000 SRL, P.O. Box 77-19, Sector 3, București, România, Tel./Fax: 4021-610 6765; Tel/Fax: 4021-210 6787; Tel: 031-104 4668 E-mail: office@orionpress.ro

Revue reconnue par le Conseil National de la Recherche Scientifique de L'Enseignement Supérieur (CNCISIS)

ACADEMIA ROMÂNĂ

Secția de științe biologice

Calea Victoriei 125

București 010071

Téléphone 4021-2128640 int. 153



© 2008, EDITURA ACADEMIEI ROMÂNÊ

Calea 13 Septembrie nr. 13

București 050711

Tel. 4021-318 8146; 4021-318 8106

Fax 4021-318 2444

E-mail: edacad@ear.ro

Web: www.ear.ro

ANNUAIRE ROUMAIN D'ANTHROPOLOGIE

Tome 45

2008

SOMMAIRE

PALÉOANTHROPOLOGIE

THOMAS A. CRIST, The value of historical osteological collection: circulatory hip disease amongst Philadelphia's Blockley Almhouse Skelletal Collection	3
GEORGETA MIU, Preliminary anthropological data on the osteological material exhumed from the Polocin ("Izlaz") location Pogonești ("La Movilă" location) cemeteries (Ivești village).....	17
ERIK TRINKAUS, Behavioral implications of the Muierii 1 Early Modern Human scapula....	27

ANTHROPOLOGIE MÉDICALE

TANJA ARENT, H.-G. SCHEIL, W. HUCKENBECK, LJUDMILA EFREMOVSKA, H.D. SCHMIDT, Allele frequencies of 12 STR-polymorphisms in populations of the Balkans	43
ELEONORA LUCA, CORNELIU VULPE, LĂCRĂMIOARA PETRE, MONICA PETRESCU, MARIUS RADU, FELICIA LUCACI, VALERIA CHILIMENT, Aspects concernant le développement métrique céphalo-facial des enfants écoliers avec déficiences de la vue.....	61
CORNELIA RADA, The assisted reproduction – an anthropological approach	67
F. ROVILLÉ-SAUSSE, Comportement alimentaire et état nutritionnel des adolescents français	79
ANA ȚARCĂ, CONSTANTIN BARABOLSKI, New aspects of the pathology of dermatoglyphics in infantile autism.....	93
CORNELIU VULPE, ELEONORA LUCA, MONICA PETRESCU, Observations concernant les dermatoglyphes digito-palmaires chez deux populations de l'Olténie.....	101

ANTHROPOLOGIE SOCIALE ET CULTURELLE

LIVIU MĂNTESCU, Le cerf vaincu – chasse à courre et néo-ruralité en Bretagne	111
--	-----

THE VALUE OF HISTORICAL OSTEOLOGICAL COLLECTIONS: CIRCULATORY HIP DISEASE AMONGST PHILADELPHIA'S BLOCKLEY ALMSHOUSE SKELETAL COLLECTION

THOMAS A. CRIST

Physical anthropologists depend on osteological collections to test and refine their analytical methods to more accurately diagnose paleopathologic lesions and, in the forensic context, identify undocumented human remains. The value of historical skeletal collections, however, extends to the documentation of unusual musculoskeletal disorders of interest not only to paleopathologists but physicians as well. In Philadelphia, thousands of human anatomical specimens in the Blockley Almshouse Skeletal Collection, dating from ca. 1834–1905, provide the opportunity to explore circulatory diseases of the proximal femur including femoral head necrosis, Legg-Calvé-Perthes Disease; and slipped femoral capital epiphysis (SFCE). Circulatory disorders during childhood development are under-represented in the archaeological record but are common today. Consequently, this review underscores the benefits of preserving and maintaining historical skeletal collections to document the untreated progression of these disorders, a rare opportunity typically unavailable in the modern clinical setting.

INTRODUCTION

In the summer of 2006, three anthropologists from Utica College, a small college located in upstate New York, traveled with 12 students to the Institutul de Antropologie “Francisc I. Rainer” al Academiei Române to teach part of the school’s annual forensic anthropology summer course using the Institute’s extensive human osteology collection.

Unknown to most American anthropologists, the Rainer Institute houses one of the world’s finest historical skeletal collections including over 6,800 modern crania collected by Romanian anatomist Francisc Josef Rainer (1874–1944), who founded the Institute in 1937 (Dumitrescu and Starcea-Craciun 2002). This was the first time that an American college conducted a course using this well-documented osteological collection, an assemblage that possesses great historical as well as anthropological value.

Like the Rainer Collection, several important American historical osteological collections were begun by anatomists in the first half of the twentieth century. These include the Robert J. Terry Anatomical Skeletal Collection at the Smithsonian Institution's National Museum of Natural History in Washington, DC; the Cleveland (Ohio) Natural History Museum's Hamann-Todd Anatomical Collection; and the W. Montague Cobb Human Skeletal Collection at Howard University in Washington, DC. Forensic physical anthropologists depend on these collections, which include many individuals of known identity, to test and refine their analytical methods to more accurately identify undocumented human remains.

The systematic collection of human specimens for educational purposes actually began more than 150 years earlier as part of the "Edinburgh model" of teaching medical students (Rosner 1992; Sappol 2004). This educational approach emphasized the use of dissected bodies to teach human anatomy and, in the United States, led to the founding of the first medical school in the American colonies in 1765 in Philadelphia. Pathologic specimens from these dissected corpses were often retained in pathology museums while the rest of the autopsied remains, no longer useful, were buried in potter's fields or otherwise discarded with little respect for the dead person.

The tradition of collecting human remains continued and flourished in the 1800s, particularly in the almshouses and hospitals for the sick poor where thousands of dead residents provided a steady supply of cadavers for autopsy and dissection. In Philadelphia, two of these nineteenth-century anatomical collections still exist: the specimens in the Mütter Museum at the College of Physicians of Philadelphia and the Samuel Morton Collection of Crania at the University of Pennsylvania Museum of Anthropology and Archaeology. Most of a third collection, from the former Blockley Almshouse morgue and Pathology Museum, was lost to history until its remnants were discovered and excavated in 2001 prior to the construction of a new parking garage at the site of the almshouse's former graveyard.

While these older osteological collections also serve as a useful resource for forensic research, they are decidedly more valuable to anthropologists, as well as physicians and other medical clinicians, for the study of the musculoskeletal disorders that they represent.

For anthropologists, these historical osteological collections allow researchers to study the long-term effects on the human body of disease, nutrition, genetics, differences in age and gender roles, and broader social and cultural conditions through time and place. Moreover, they manifest the biological variation that exists among population subgroups as well as the effects on the human species produced by regional environmental changes.

Physicians and other medical practitioners as well as paleopathologists benefit from these osteological collections because they invariably include a broad range of pathologic specimens. These specimens often demonstrate the consequences of disease, trauma, and taphonomy that may not otherwise be

observable in modern populations due to ethical concerns or the simple lack of sufficient numbers of cases. Common fractures and unusual musculoskeletal disorders may be documented using these historic-period remains, which predate modern surgical practices. The gross bony changes associated with the healing process are clearly available for study and often reveal the effects of rare diseases and genetic anomalies. In other cases the outcomes of various surgical attempts are reflected, perhaps leading to more effective modern treatments.

An excellent example of such research using a nineteenth-century skeletal collection is a recent paper on cranial healing following gunshot wounds published in the *Journal of Forensic Sciences* (Barbian and Sledzik 2008). These researchers examined 127 well-documented crania from the American Civil War skeletal collection (1861–1865) at the National Museum of Health and Medicine, Armed Forces Institute of Pathology in Washington, DC to document the timing of specific skeletal responses associated with bone healing. Based on the gross examination of their sample crania Barbian and Sledzik (2008) found that, in most cases, no osseous response was present during the first week post-fracture and that both the osteoblastic and osteoclastic activity peaked at the sixth week after the trauma occurred.

These results are certainly applicable to forensic anthropologists and pathologists, who for legal reasons often need to determine the period between the onset of trauma and the time of death as well as distinguish between perimortem and postmortem fractures (Maples 1986; Sauer 1998). Physicians also need to have accurate information regarding the normal pattern of cranial healing, especially to identify atypical delays in the process when treating their patients.

Similar to the Barbian and Sledzik (2008) study, the present research utilizes a nineteenth-century hospital skeletal collection to explore the consequences of disrupted blood supply to the proximal femur in the pre-surgical era. Ortner (2003:346) notes that “In the paleopathological literature, circulatory disturbances have received little attention.” Consequently, this paper examines the prevalence of Legg-Calvé-Perthes Disease (Perthes Disease) and slipped femoral capital epiphysis (SFCE), both circulatory disorders of the hip that arise during childhood, amongst the human remains from Philadelphia’s nineteenth-century Blockley Almshouse morgue and Pathology Museum. Previous studies of pathology in this collection conducted by two groups of physical therapy graduate students were directed by the author and published as a master’s thesis (Fus et al. 2006) and a doctoral research project (Curri et al. 2008).

From a clinical perspective, the “relation between physical forces and the processes of bone regeneration and healing remains incompletely understood” (Richards et al. 1998:191). As such, the results of this research are of use to anthropologists and clinicians studying osteogenesis in response to trauma of the hip during development.

THE BLOCKLEY ALMSHOUSE SKELETAL COLLECTION

Discovered and excavated in 2001, the Blockley Almshouse Skeletal Collection represents the only assemblage of human remains from one of America's primary centers of medical education. Including thousands of intact and partial skeletal specimens and teeth, the collection reflects the choices of dissections, autopsies, and surgical experiments made by some of early medicine's most prominent educators. Among these was Dr. William Osler, often described as the "Father of Modern Medicine," who served as Chair of Clinical Medicine at the University of Pennsylvania and in 1885 was appointed Visiting Physician to Blockley's General Hospital. Dr. Osler conducted autopsies and dissections at Blockley between 1884 and 1889.

The Blockley Almshouse opened in 1834 to replace the old Philadelphia Almshouse, which had been located in the center of Philadelphia near historic Independence Hall (Agnew et al. 1890; Croskey 1929; Lawrence 1905). Located well outside of the city in west Philadelphia, Blockley originally consisted of four large buildings with wards for the mentally ill, infectious patients, single mothers, and orphans and children (Figure 1). As one of Blockley's resident physicians wrote in the 1880s, "The almshouse is merely a receptacle of the miserable and helpless, and, in Blockley, there are added hospitals for the physically and mentally ill" (Bliss 1916:5).

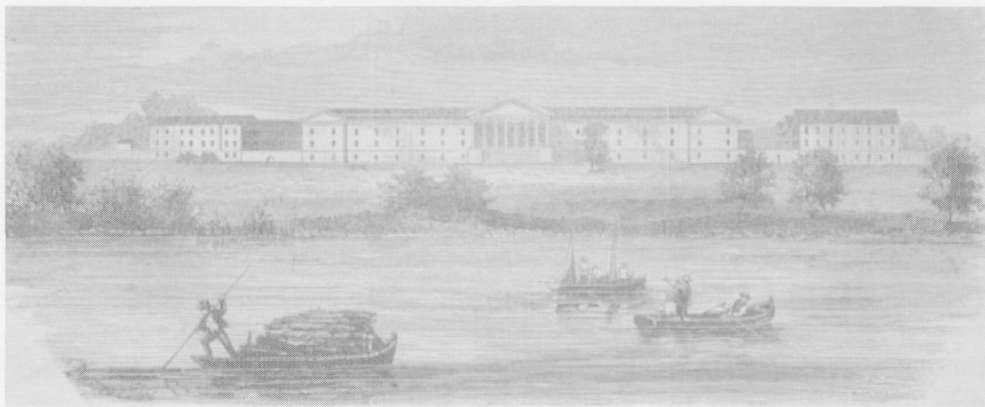


Figure 1. Blockley Almshouse in 1853 facing main entrance from Schuylkill River.

The almshouse campus expanded throughout the last half of the nineteenth century to include the construction of a "dead-house" where autopsies and dissections were performed and, in 1860, the establishment of a Pathology Museum with the express goal of creating "the most valuable collection of morbid anatomy to be found anywhere in the country" (Agnew 1890 [1862]:33). Since the

dead-house was directly attached to the surgical operating room the remains of deceased residents were regularly wheeled into the morgue for dissection, their pathologic structures removed and embalmed for display in the museum while the rest of their remains were buried in the almshouse's cemetery, located in a field across the road from the main entrance.

It was this burial ground that was discovered in February 2001 during construction of a new parking garage at the intersection of Civic Center Boulevard and University Avenue (38th Street) in West Philadelphia. In use until about 1890, the burial ground had been abandoned when the Blockley Almshouse was reconstituted as the Philadelphia General Hospital in 1905.

Subsequently left as an empty field and then covered by a paved parking lot in the 1970s, archaeologists from Kise Straw & Kolodner, Inc. began excavating the former burial ground in February 2001 under the direction of the author. The University of Pennsylvania and Children's Hospital of Philadelphia, joint owners of the parking garage, funded the archaeological excavations. Portions of the present research were funded through a Utica College Student Small Grant; no funds for analysis were provided by the parking garage owners.

When completed in May 2001, the excavations had revealed the remains of 448 individuals buried in separate wooden coffins and 138 wooden boxes arranged in 11 clusters that contained thousands of human skeletal remains from the almshouse's morgue and Pathology Museum (Morrell et al. 2004). In May 2002, the 448 individuals were reburied at historic Woodlands Cemetery in West Philadelphia.

Because of their historical and anthropological value, however, the anatomical specimens were transferred to Utica College in Utica, NY for examination and analysis in accordance with a Philadelphia Orphans' Court Order issued in 2002. The Orphans' Court authorized subsequent osteological research using the collection through a long-term loan agreement between Utica College, the parking garage owners, and the Mütter Museum of the College of Physicians of Philadelphia, the latter of which had received some specimens from the Blockley Pathology Museum when it was dismantled in the early twentieth century. Presently stored at the Utica College Anthropology Laboratory, the Blockley Almshouse Skeletal Collection now comprises thousands of intact and fragmentary crania, postcranial remains, and teeth, a large proportion of which present evidence of pathology, autopsy, and dissection (Curri et al. 2008; Fus et al. 2006; Hynes et al. 2005). Together these remains provide unique information, unavailable from any other source, regarding disease and pathology among Philadelphia's nineteenth-century poor as well as insights into early American medical education and the development of modern surgical practice.

CIRCULATORY HIP DISORDERS AT THE BLOCKLEY ALMSHOUSE

As part of this research, the author and 11 Utica College physical therapy graduate students grossly examined all of the thousands of bones and bone fragments in the Blockley Almshouse Skeletal Collection over a period of eight months for the presence of pathologic specimens (Curri et al. 2008; Fus et al. 2006). Eight adult proximal femora present evidence of healed fracture, femoral head displacement, and/or necrosis of the femur head. One of these specimens presents necrosis of unknown etiology; a second presents necrosis and other bony lesions indicative of Legg-Calvé-Perthes Disease; and two other femora represent cases of slipped femoral capital epiphysis. Each specimen represents a different individual, none of whom can be personally identified since no medical records from this time exist. No other skeletal elements associated with these individuals, including the articulating os coxae, could be identified in the collection.

Two specimens presented necrosis of the femur head. The first specimen is a left proximal femur that exhibits extensive porous degeneration of the head with

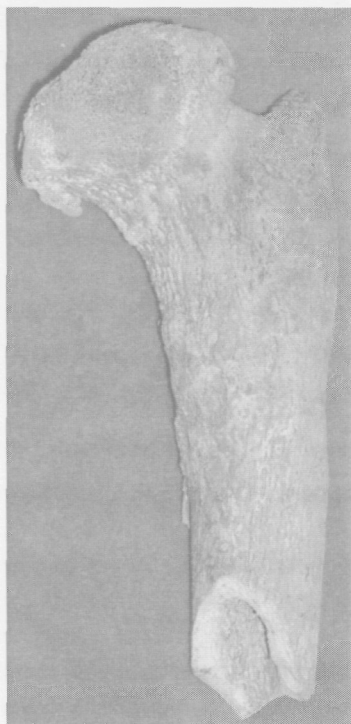


Figure 2. Left femure exhibiting extensive necrosis of the head and a large, inferior marginal osteophyte, anterior aspect.

complete exposure of the underlying trabeculae and obliteration of the fovea capitis (Figure 2). The femoral neck is normal as is the position of the femoral head relative to the axis of the neck. The proximal epiphyses are fully fused and the diameter of the head is 54 mm, indicating that the bone is from an adult male. The greater trochanter is absent and had been lost postmortem. Periarticular osteophytic lipping is present inferiorly and posteriorly around the circumference of the head, with a large osteophyte extending 5 mm inferiorly from the head's inferior margin. The diaphysis inferior to the neck and along the anterolateral aspect of the bone presents swelling, porosity, and remodeled reactive lesions consistent with an inflammatory condition, possibly osteomyelitis.

As described by Ortner (2003:344–346), the porous appearance of the femoral head results from aseptic vascular necrosis of its cortical tissue subsequent to localized trauma or hip dislocation that compromised the arterial supply to the region. Necrosis of the femur head often follows even indirect trauma to the lower extremity because only a single artery, the medial circumflex femoral artery (a branch of the

femoral artery), provides most of the blood to the femoral neck and head (Moore and Dalley 2006:682). Since the retinacular arteries to the femur head that arise from the medial circumflex femoral artery run parallel to the femoral neck, they are particularly susceptible to rupture in fractures of the femoral neck and intertrochanteric region. The much smaller acetabular branch of the obturator artery, which is transmitted to the femur head through the ligament teres that runs from the acetabular notch to the head's fovea capitis, lacks the capacity to provide adequate blood supply to the head and is itself often ruptured subsequent to trauma or dislocation. Some flattening of the femur head in this specimen suggests that subchondral bone loss had occurred antemortem; such deformation has been identified as an early clinical sign of eventual hip collapse (Ohzono 1991).

Necrosis of the femur head is also associated with arterial disruptions that occur during young childhood and the adolescent years. These conditions include Legg-Calvé-Perthes disease (or Perthes disease) and slipped femoral capital epiphysis (SFCE). Three of the femora from the Blockley Skeletal Collection present convincing evidence of these disorders.

The etiology of Perthes disease is unclear but is probably initiated by trauma. It also has been linked to malnutrition and may have a genetic component (Miyamoto et al. 2007). The disorder involves a temporary loss of blood supply to the capital femoral epiphysis (femur head) in children 3-12 years old but usually occurs in patients between the ages of 5-9 years old (Frick 2006; Resnick 2002; Taylor and Resnick 2000:489). The disorder occurs five times more often in boys and is usually unilateral. The lesion typically resolves and remodels if no comorbid conditions are present. In the absence of modern treatment, in children older than six years the femoral head may be significantly malformed and result in early-onset, severe arthritis of the hip and knee.

In the modern era, Perthes disease is treated non-surgically by casting, braces, and physical therapy (Herring 1994). Surgical treatment involves re-establishing the proper alignment of the femur and the os coxa through the use of metal plates and screws with a tenotomy to lengthen the chronically contracted muscles of the anterior and medial thigh.

In dry skeletal remains, Perthes disease is characterized by flattening and "mushrooming" of the femur head, obliteration of the fovea capitis by porosity caused by necrosis, and thickening of the femoral neck (Ortner 2003:346-349). The position of the femur head relative to the neck remains normal, as does the length of the femoral neck. Perthes disease can be distinguished from aseptic necrosis by the mushroom-shaped femur head and marked overgrowth of the joint margins.

The second femur in the Blockley Skeletal Collection that presents with necrosis of the head is a left femur with moderate porous degeneration covering

most of the articular surface that had obliterated the fovea capitis (Figure 3). This necrotic area is circumscribed by a continuous, 4–8 mm-wide ring of sclerotic bone around the head's margin (Figure 4). This ring is smooth and shiny, consistent with eburnation. A flattened osteophytic plateau 16 mm wide and 28 mm long antero-posteriorly extends inferiorly and posteriorly along the head's inferior margin. The periarticular lipping continues posteriorly to the top of the neck and onto its anterior surface but had been broken away postmortem. The greater trochanter is absent, also lost postmortem. The maximum diameter of the head is 48 mm, the midshaft circumference is 90 mm, and all of the proximal epiphyses are completely fused, indicating that that this femur is from an adult male. The head is flattened superiorly and elongated medially (mushroom-shaped) but the neck is normal although partially obscured by the hypertrophic periarticular bone formation. As illustrated by Ortner (2003:348; 350), these are the diagnostic lesions associated with Perthes disease.

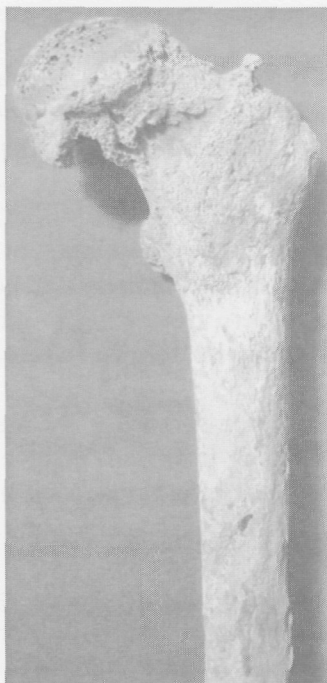


Figure 3. Left femur presenting necrosis circumscribed by marginal sclerotic bone resulting from Legg-Calvé-Perthes Disease, anterior aspect.



Figure 4. Necrosis of femoral head with exposed trabeculae and marginal sclerotic ring resulting from Legg-Calvé-Perthes Disease, medial aspect.

In contrast, two other proximal femora in the Blockley Skeletal Collection present lesions that represent the results of slipped femoral capital epiphysis (SFCE).

SFCE is a disorder observed most often in children 10–17 years old. More common in boys and possibly of genetic origin, it also occurs as a result of trauma, hormonal changes during puberty, and especially obesity (Murray and Wilson 2008; Resnick 2002). The primary pathogenesis of the disorder is a shear fracture through the metaphyseal plate and the femoral neck resulting in significant infero-posterior displacement of the head. Unlike in Perthes disease, the femoral neck is always shortened and thickened and the fovea capitis remains well-defined although displaced much nearer the inferior margin of the head than normal (Ortner 2003:346–349; Yildirim et al. 2008). Consequently, the superior margin of the head is found below the level of the greater trochanter.

In the historical period, lack of surgical intervention resulted in adult leg-length discrepancies, severe early-onset arthritis of the hip and knee, and possible necrosis of the femoral head. Modern treatment consists of stabilizing the hip using metal pins, screws, and wires followed by physical therapy to re-establish range of motion at the hip following fusion of the epiphysis.

The first specimen in the Blockley Collection that represents SFCE is a right femur that exhibits significant inferior displacement of the head with coincident abnormal shortening of the neck (Figure 5). While the superior margin of the head lies 28 mm below the level of the greater trochanter, the head itself is normal in shape. The fovea capitis is present and well-defined, with minor postmortem loss inferiorly.

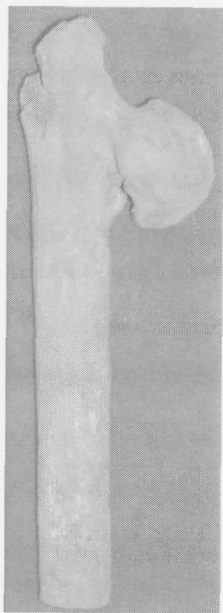


Figure 5. Right femur presenting inferior displacement of the head with abnormal shortening of the neck resulting from slipped femoral capital epiphysis, anterior aspect.

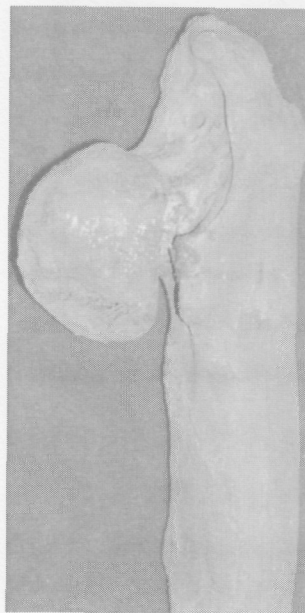


Figure 6. Right femur demonstrating results of slipped femoral capital epiphysis, posterior aspect.

There is no necrosis of the head or any evidence of degenerative joint disease, although the attachment site for the gluteus maximus on the posterior surface presents mild enthesopathy (Figure 6). This specimen closely resembles the two examples of SFCE depicted in Ortner (2003:351–352). The diameter of the femoral head is 44 mm, the midshaft circumference is 82 mm, and all of the epiphyses are completely fused, indicating that this bone is likely from an adult male. The distal half of this femur is present, although separated by a dissection cut, and exhibits eburnation of the posterior half of the lateral condyle along with mild osteophytic lipping along its antero-superior margin.

The second bone that presents with SFCE is a left femur missing its distal end that also exhibits inferior displacement of the head with concomitant shortening of the neck (Figure 7). In this case, the superior margin of the head lies 5 mm below the level of the greater trochanter. The fovea capitis is present and well-defined and there is no evidence of osteophytic response. The maximum diameter of the femoral head is 40 mm and the midshaft circumference is 76 mm, indicating that this bone is from a female. A visible epiphyseal line extends along

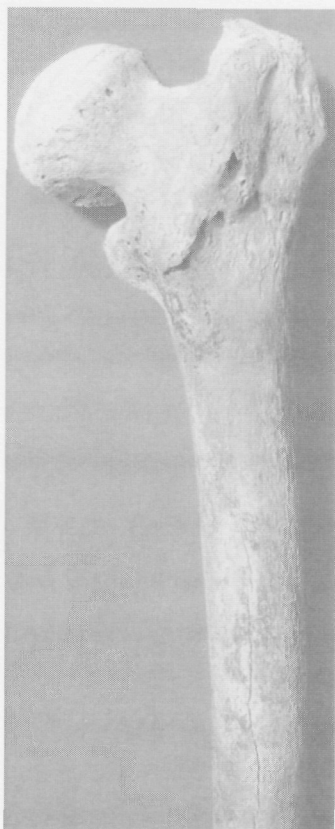


Figure 7. Left femur presenting inferior displacement of the head and shortening of the neck consistent with slipped femoral capital epiphysis, anterior aspect. Note remodeling of attachment site for the iliofemoral ligament in the intertrochanteric region.

the inferior margin of the head but the other proximal epiphyses are completely fused, indicating that this woman was in her early twenties when she died. Unlike the other SFCE specimen (HF-2), this femur presents a raised, remodeled mass 55 mm long across the anterior intertrochanteric region where the iliofemoral ligament attaches.

DISCUSSION AND CONCLUSIONS

Circulatory hip disease is under-represented in the paleopathologic record and is uncommon among human remains recovered from archaeological sites (Ortner 2003:346). Consequently, the true value of historical osteological collections, including those housed at the Institutul de Antropologie "Francisc I. Rainer," lies in their capacity to provide specimens that demonstrate the results of uncommon musculoskeletal disorders such as Perthes Disease and slipped femoral capital epiphysis (SFCE).

The hospital at the Blockley Almshouse was known until the turn of the twentieth century for the pathology museum that displayed hundreds of unusual pathologic specimens. On its shelves were large glass jars containing "impossible babies or specimens of various organs gone wrong by disease" (Bliss 1916:29). Forgotten for more than a century, the bone specimens in what is now the Blockley Almshouse Skeletal Collection reflect the healing processes and clinical outcomes of numerous diseases that affected Philadelphia's sick poor in the pre-surgical era. These include the circulatory disturbances of the proximal femur associated with Perthes Disease and SFCE, two developmental disorders that begin in childhood and are manifest by the adult specimens documented in this paper.

Since both disorders may result in femoral head necrosis and degenerative arthritis in adulthood, a differential diagnosis distinguishing between them is often difficult to make. Historical skeletal collections provide opportunities to document the lesions that are diagnostic of specific diseases, allowing for more accurate paleopathologic diagnoses and better clinical management. Collections that include remains of known individuals are even more beneficial to researchers, especially if they are complemented by medical histories. Even though the terminology of disease symptoms and diagnosis has evolved considerably over the centuries, the research potential of historical skeletal collections will only increase as evermore sophisticated technological methods are developed to study them.

For more than 70 years during the nineteenth century, the physicians and their students at the Blockley Almshouse dissected thousands of their patients to further medical education and research. Some 100 years later, the remains of these unfortunate individuals, forever anonymous, continue to serve as effective teaching tools.

ACKNOWLEDGMENTS. The opportunity to write this paper began with an invitation to offer a component of Utica College's annual summer forensic anthropology course at the Institutul de Antropologie "Francisc I. Rainer" in 2006. For their gracious hospitality I would like to thank Dr. Cristiana Glavce, Dr. Matei Starcea-Craciun, Dr. Nicolae Miritoiu, and especially Andrei Soficaru. I also acknowledge the invaluable contributions made by my colleagues Dr. John H. Johnsen and Dr. Anamaria Iosif Ross, with whom I teach Utica College's annual summer course. I appreciate the ongoing support of my research by Dr. Dale Scalise-Smith, Dean K. Della Ferguson, and Dean Laurence Roberts, all of Utica College. Finally, I am indebted to the graduate students in Utica College's Physical Therapy Program that I have been so fortunate to work with as well as the many archaeologists who patiently excavated the human remains from the former Blockley Almshouse Burial Ground in 2001 under the careful direction of Douglas Mooney and Kimberly Morrell.

REFERENCES

- Agnew, D. H., Stillé A., Bush L. P., Mills C. K., Curtin R. G. 1890, *History and Reminiscences of the Philadelphia Almshouse and Philadelphia Hospital*, Detre and Blackburn, Philadelphia.
- Agnew D. H. 1890, *The Medical History of the Philadelphia Almshouse*, In *History and Reminiscences of the Philadelphia Almshouse and Philadelphia Hospital*, edited by D. H. Agnew, A. Stillé, L. P. Bush, C. K. Mills, and R. G. Curtin, pp. 1–55, originally presented as a lecture on 15 October 1862, Detre and Blackburn, Philadelphia.
- Barbian L. T., Sledzik P. S 2008, *Healing Following Cranial Trauma*, *Journal of Forensic Science* **53** (2), p. 263–268.
- Cooper A. 1851, *A Treatise on Dislocations and Fractures of the Joints*, New American Edition, Blanchard and Lea, Philadelphia.
- Croskey J. 1929, *History of the Philadelphia General Hospital from its Inception, 1731–1928*, F.A. Davis, Philadelphia.
- Curri D., Kohler A., Papelino A., Weche S. 2008, *Behind the Scenes at Old Blockley: Paleopathology of Human Remains from Cluster Three*, Unpublished Doctoral Thesis, Program in Physical Therapy, Utica College, Utica, NY.
- Dumitrescu S., Starcea-Craciun M. 2002, *Rainer*, Editura Anastasia, Bucharest.
- Frick S. L. 2006, *Evaluation of the Child who has Hip Pain*, *The Orthopedic Clinics of North America* **37**(2), p. 133–140.
- Fus, Jr. A. J., Kaiding S., Kamme M., Kelly K., Montante A., Romandetti M., Secor A. 2006, *Pathology among Philadelphia's Blockley Almshouse Skeletal Collection*, Unpublished Master's Thesis, Program in Physical Therapy, Utica College, Utica, NY.
- Herring J. A. 1994, *The Treatment of Legg-Calvé-Perthes Disease. A Critical Review of the Literature*. *The Journal of Bone and Joint Surgery, American Edition* **76**(3), p. 448–458.
- Hynes S. E., LePinnet, E. A., Ramos Y. 2005, *"Receptacle of the Miserable and Helpless": Analysis of Dissected Human Remains from Philadelphia's Blockley Almshouse Burial Ground*, Unpublished Master's Thesis, Program in Physical Therapy, Utica College, Utica, NY.
- Lawrence C. 1905, *History of the Philadelphia Almshouses and Hospitals*, Private Printing.
- Maples W. R. 1986, *Trauma Analysis by the Forensic Anthropologist*, in *Forensic Osteology: Advances in the Identification of Human Remains*, edited by K. J. Reichs and W. M. Bass, pp. 218–228, Charles C. Thomas, Springfield, IL.
- Miyamoto Y., Matsuda T., Kitoh H., Haga N., Ohasi H., Nishimura G., Ikegawa S. 2007, *A Recurrent Mutation in Type II Collagen Gene Causes Legg-Calvé-Perthes Disease in a Japanese Family*, *Human Genetics* **121**(5), p. 625–629.

- Morrell K., Mooney D. B., Glumac P., Crist T. A. 2004, *Rejected in Life, Forgotten in Death: The Rediscovery of a Cemetery Associated with the Blockley Almshouse, Philadelphia, Pennsylvania*, Paper presented at the 34th annual meeting of the Middle Atlantic Archaeological Conference, Rehoboth Beach, DE.
- Murray A. W., Wilson N. I. 2008, *Changing Incidence of Slipped Capital Femoral Epiphysis: A Relationship with Obesity?*, Journal of Bone and Joint Surgery – British Volume **90**(1), p. 92–94.
- Ohzono K., Saito M., Takaoka K., Ono K., Saito S., Nishina T., Kadowaki T. 1991, *Natural History of Nontraumatic Avascular Necrosis of the Femoral Head*, Journal of Bone and Joint Surgery – British Volume. **73-B** (1), p. 68–72.
- Ortner D. J. 2003, *Identification of Pathological Conditions in Human Skeletal Remains*, 2nd edition, Academic Press, Orlando.
- Resnick D. 2002, *Diagnosis of Bone and Joint Disorders*, 4th edition, W.B. Saunders, Philadelphia.
- Richards M., Goulet J. A., Weiss J. A., Waanders N. A., Schaffler M. B., Goldstein S. A. 1998, *Bone Regeneration and Fracture Healing: Experience with Distraction Osteogenesis Model*, Clinical Orthopaedics and Related Research Supplement **355**, p. S191–204.
- Rosner L. 1992, *Thistle on the Delaware: Edinburgh Medical Education and Philadelphia Practice, 1800-1825*, Social History of Medicine **5** (1), p. 19–42.
- Sappol M. 2004, *A Traffic of Dead Bodies: Anatomy and Embodied Social Identity in Nineteenth-Century America*, Princeton University Press, Princeton.
- Sauer N. J. 1998, *The Timing of Injuries and Manner of Death: Distinguishing among Antemortem, Perimortem, and Postmortem Trauma*, in *Forensic Osteology: Advances in the Identification of Human Remains*, 2nd edition, edited by K. J. Reichs and W. M. Bass, p. 321–332, Charles C. Thomas, Springfield, IL
- Yildirim Y., Bautista S., Davidson R. A. 2008, *Chondrolysis, Osteonecrosis, and Slip Severity in Patients with Subsequent Contralateral Slipped Capital Femoral Epiphysis*, The Journal of Bone and Joint Surgery, American Edition **90**(3), p. 485–492.

Utica College
1600 Burrstone Road
Utica, New York 13502-4892
315.792.3390 (office)
E-mail: tcrist@utica.edu

PRELIMINARY ANTHROPOLOGICAL DATA ON THE OSTEOLOGIC MATERIAL EXHUMED FROM THE POLOCIN (“ISLAZ” LOCATION) AND POGONEȘTI (“LA MOVILĂ” LOCATION) CEMETERIES (IVEȘTI VILLAGE)

GEORGETA MIU

The study provides some preliminary data on the bony materials exhumed from two (Sântana de Mureș – type) cemeteries (necropolises) of the IVth century, in the Bârlad area, namely **Polocin (“Islaz” location) and Pogonești (“La Movilă” location)**. The bones under investigation belong to two series, one including 46 individuals (33 buried and 13 incinerated) from the bi-ritual cemetery of Polocin, and a latter one, numerically more reduced, and representing the skeleton-like rests of 26 (buried) individuals from the cemetery of Pogonești.

The biomorphological analysis of all cases has evidenced, in both groups, a certain typological polymorphism within which the ethnical components present, *i.e.*, the Mediterranean (better expressed in Polocin) and, respectively, the Nordoid one (more important in Pogonești) are of majority. There are also present, as secondary structural elements, some Dinaroid, Alpinoid and – in only one case – East-Europoid elements.

At Polocin, the funerary practices discovered, along with the mortality ratios, covering all groups of age, evidence the sedentary character of this population, the main occupations of which had been – probably – agriculture, animal breeding (if considering the amounts of offerings found in the graves) and hand – made goods (if considering the pottery objects digger out).

At Pogonești, where a Nordoid typological component is predominant, suppositions may be made on the possible installation of a migratory group (possibly, Gothic), which might have constituted a separate enclave in the vicinity of Polocin, to be assimilated, in time, by its inhabitants.

Nevertheless, up to an exhaustive exhumation of the two necropolises, this idea should be considered only as a hypothesis.

INTRODUCTION

Several archaeological and historical proofs support the idea that, in the end of the 3rd and beginning of the 4th century, the autochthonous civilization from the extra-Carpathian regions of the old Dacia has suffered a series of important

social and economic, cultural and political transformations, which may be explained by the ever-increasing contacts of this population with some migratory – Sarmatian, Germanic, etc. – tribes, known as having crossed our territory in those times (Teodor 1989: 198–212). Arrival and settlement of such tribes – the Germanic ones (*i.e.*, the Goths), especially – brought about several modifications, not only of material and spiritual nature, but also in the anthropological and demographic structure of the local populations.

The results of the archaeological investigations developed in a large number of human settlements from the IIIrd and IVth centuries (from the districts of Vaslui, Suceava, Botoșani, Neamț) have nevertheless evidenced that the civilization of the whole territory of Moldova is, along the above-mentioned period (and later) quite unitary, groups of sedentary people (farmers and animal breeders) having been attested everywhere (Teodor 1989: 198–212).

Equally, investigations performed on several (more or less extended) necropolises, characterized by bi-ritualism, led to the accumulation of a highly precious paleoanthropological material, the study of which contributed to evidencing of the main typological compounds of their carriers, who are actually the creators of what is now called the *Sântana de Mureș* culture.

As to the Moldova region, significant results have been obtained in both archaeological and paleoanthropological investigations, resulting from the archaeological diggings made at Miorcani, Mihălășeni, Hănești – district of Botoșani (Botezatu 2001: 131–484; Miu 1981: 3–8), Barcea – district of Galați (Miu et al. 1988: 3–9), Bogdănești, Pietriș, Valea-Seacă – district of Vaslui (Botezatu et al. 1987: 91–108; Botezatu et al. 1973: 3–13; Botezatu et al. 1983: 17–26), Erbiceni – district of Iași (Necrasov 1962: 219–223; Botezatu et al. 1973: 3–13), which permitted the elucidation of several spiritual, as well as paleodemographic and paleoanthropological aspects.

The concomitant, archaeological and paleoanthropological documentation on the migratory period, based on the new findings in the whole Vaslui region – *i.e.*, the cemeteries of **Polocin** (“**Islaz**” location) and **Pogonești** (“**La Movilă**” location) – enrich and complete the existing knowledge by the elucidation of some aspects related to the spiritual life, material culture and bio typological structure of the groups of populations from this micro-area.

MATERIALS AND METHOD

The present study performs a preliminary analysis of the human osteological material digger out during the archaeological investigations made in the two above-mentioned cemeteries, situated in the actual commune of Pogonești, district of Vaslui (the IVth century), as follows: one in the actual village of **Polocin** - “**Islaz**” location, and the latter, in the vicinity (at a distance of about 400 m), in

the actual village of **Pogonești** – “**La Movilă**” **location** (Mamalaucă 2007 51–56) The investigations have been performed by specialists from the “Vasile Pârvan” Museum of Bârlad, led by the director of this institution, archaeologist Mircea Mamalaucă

From the very beginning, mention should be made of the fact that the work is not over, so that the results of the anthropological and archaeological investigations should be considered valid only after the total exhumation of proofs

From the bi-ritual cemetery of **Polocin** – “**Islaz**” **location** (which is predominantly an inhumation place), 49 skeletons or skeleton-like rests (most of them unsuitably preserved – of which 33 are from inhumation tombs (67 37%) and 16 from incineration tombs (32 65%) – have been taken over for the study

The osteological series exhumed from the Pogonești cemetery is more reduced numerically, amounting to only 26 skeletons – all of them of the inhumation type (according to the archaeological data, 5 incineration tombs might have discovered, as well) A careful analysis of the incinerated skeleton-like rests from the first cemetery permitted to establish only the age and the sex, being therefore employed, besides the inhumated ones, for estimating the mortality of the group of persons under study, on sexes and age

In the buried skeletons, determination of the sex and age in the moment of death was performed according to the methods and techniques established during the international meetings of the anthropologists from Prague (1973) and Sarospatak (1978)

The biometric, conformational, somatoscopic and typological study of each skeleton was based on the methods currently employed in paleoanthropological investigations (Alexeev et al 1964, Bretinger 1938 249–274, Eickstedt 1937–1943, Manouvrier 1893 347–402, Martin et al 1957–1966 429–597, Olivier 1969 115–269, Trotter et al 1958 79–123)

As only reduced, unsuitably preserved series had been available for the establishment of the bio-typological characteristics, an individual analysis of each skeleton has been performed, on considering that a statistical analysis of the metrical data and of the corresponding indices (average values, sigmatic values, variability coefficients) is not recommended, especially if the migrating period is involved, which is the opinion of other authors, as well (Nicolăescu-Plopșor 1967 101–110)

RESULTS AND DISCUSSION

1. Paleo-demographic data

If initiating the analysis on the sample group of incinerated skeletons (16 in number), mention should be made first of its structure, which is the following 8

children (with ages between 0–6 and 7–14 years, respectively), 2 teen-agers (a male and a female) and 3 mature persons (an adult woman and two adult men).

The distribution of the skeletons under analysis on sex and age (Table 1), in the two series, evidences quite striking differences as to the mortality ratio between the children's group of age (0–14 years) and the one of the mature people (30 years).

Consequently, if at Polocin the number of children deceased between ages of 7–14 years (both inhumated and incinerated) represents more than half of the series (about 53), at Pogonești, only two deceased children (both younger than 7 years) have been found.

Together with the teen-ages (5 at Polocin and 1 at Pogonești), the mortality ratio for subjects having not reached adult ages amounts to about 63% at Polocin, while at Pogonești it is only 11%. Nevertheless, the mortality ratio recorded in the mature group is double at Pogonești comparatively with the one at Polocin (*i.e.*, 63% *versus* about 25%). The adults' group evidences no significant differences, mortality being, however, somewhat higher at Pogonești (*i.e.*, 19% *versus* about 12%).

Such differences are also reflected in the average life duration of the two groups of populations (from the settlements corresponding to the necropoles), as calculated on the basis of the average age of death, both for the 0–x year age series and on sexes, for the 20–x year group of age.

As shown in Table 2, at Pogonești, the average lifetime for the whole series (0–x years) is significantly higher than at Polocin (*i.e.*, 38.7% *versus* 20.9 % years), the higher longevity in the first group being induced by the more reduced frequency of children's mortality, on one side, and by the higher ratio of grown-ups, on the other. Yet, for the 2–x year group of age, the average lifetime is quite close in both sexes, being slightly higher at Pogonești *versus* Polocin (with about 5 years in men and about 3 years in women).

Comparatively with other synchronous osteological series (Tables 1 and 2) from necropoles of the same area – *i.e.*, Valea Seacă (Botezatu et al. 1983: 17–16; Miu et al. 1991: 13–18), and Bogdănești (Botezatu et al. 1987: 91–108) – it has been observed that the highest ratio of children's mortality and the shortest average life time are recorded at Polocin. On sexes, for the 2–x year group of age population, the longevity values recorded are quite close to one another, ranging between 41.7% and 46.6% years in the masculine series and, respectively, between 31.6% and 42% years – in the feminine ones.

Certain differences are determined, as well, by the numerical composition of the sample groups taken into study.

2. Bio-morphoscopic and typological data

If considering first the inhumation osteological material from the **Polocin - "Islaz" location necropole** (which is numerically more representative), the whole complex of metrical –conformative and microscopic – characters defining each skeleton attests the dominating presence, of some Mediterranean-type forms, in the case of more complete structures, or of some elements of the Mediterranean type, in the case of less conserved ones. Among the Mediterranean-type, one may individualize some types possessing protoeuropoid reminiscences, such as the case of the M9, M11, M29, M31 – masculine skeletons characterized by dolico-mesocrane skulls (63.86–77.54 u.i.), ovoid in shape and with convex occiput, relatively low height – the camecrane (53.09–56.14 u.i.) and tapeinocrane type (70.94–76.87 u.i.), respectively, and with a metriometope (66.40–68.87 u.i.) or eurimetope (70.14–74.4 u.i.) forehead; the face is low, of the euriprosop type (83.33 u.i.), yet mesene (50.6 u.i.), the orbit being of the came-mesoconca (rather low – 76.82% u.i.) type, the nose: mesorine (50.0 u.i.), with average or slightly higher malares placed rather frontalized, the canine fossa being weak or moderate and the mandible – rather robust; the size is moderate (equal values of 167 cm being recorded); moderately robust aspect.

In other, more delicate skeletons, some Mediterranean forms may be even mentioned – which is case of the feminine skeletons (M2, M8, M23) and also of the masculine one (M45), the skulls of which are characterized by mesochrany, average ortocrane height, attenuated relief; the slightly higher face is meso-leptoprosop and mesene, the orbit being mesoconca and the nose-leptorine; the stature is moderate or small (156–158 cm).

In some other feminine skeletons (M1, M2, M13), the (dominating) Mediterranean-type elements are mixed with Alpine elements (occurring especially at the level of the skull), so that they might be defined as Mediterranean-Alpine.

They are characterized by moderate fragility, supra-average stature (158–159 cm), the brahocrane skull, spheroid as to the vertical norm and with slightly – convex occiput is of low height – camecrane (57.83–59.03 u.i.) and tapeinocrane (69.59 u.i.), the forehead is stenometope (48.68 u.i.) or metriometope (68.14 u.i.); the rounded face is mesoprosop (89.06 u.i.) and mesene (50.02 u.i.) with moderately-high malares, situated in either intermediary or even slightly frontalized position.

A masculine skeleton (M27) evidences a Dinaroid form, characterized by high stature (182 cm), highly brahocrane skull (85.79 u.i. – which means: hyperbrahocrane), high, ramboid in shape; the face could not have been recorded.

Finally, the presence of a type with Nordoid elements should be mentioned, in the M3 feminine skeleton, whose skull is of dolico-towards the mesocrane type (74.4 u.i.); ovoidal in shape, relatively high – of hipsocrane and metriocrane type

and attenuated relief; the face is high – leptoprosope (92.12 u.i.) and mesene (54.43 u.i.), with high orbitals of the hipsiconc type (92.10 u.i.), leptorine nose (46.15 u.i.), delicate malares, situated in temporalized position, and deep canine fossa; the stature is supra-median (157 cm).

All the above observations show that the Polocin population group possessed – apart from other secondary typological (*Alpine, Dinaroid, Nordoid*) elements –, a most obvious *Mediterranoid type component*.

As to the **Pogonești series**, this is formed, as already mentioned, of 26 inhumation skeletons, of which 2 belong to children.

Out of the 24 skeletal remains (adults, grown-up and senile ones), 8 are represented only by the post cranial part (the cephalic segment being totally absent). Thus, the number of skeletons that may provide metrical and morphomicroscopical elements is substantially reduced. Some of the skeletons, such as the masculine (M1, M47, M48) and the feminine (M11, M15, M52) ones are highly deteriorated and incomplete, so that no typological information might be obtained from them.

Few the numbers of skeletons providing a complete series of bio morphological data seems to indicate a different situation from that of Polocin as to the contribution of the anthropological components observed. Such a difference might be expressed by a more substantial presence of the Nordoid elements, to be evidenced mainly on the masculine skeletons, although they may appear on the feminine ones, as well. Thus, in the case of the M6 – masculine and, respectively, M2 – feminine, skeletons, the Nordoid forms appear in the classical sense of the term, once they induce obvious Nordoid peculiarities (stature over 171 and 162, respectively). In the case of other 5 skeletons, in whom the skulls could not have been recorded at all (as a result of unsuitable conservation) *i.e.*: M16, M36, M38 – masculine, and M13, M20 – feminine ones, one may mention exclusively the presence of some Nordoid elements (tall stature, between 171 – in men and between 161 –, respectively, in women) delicate, high mandible with a slightly oblique vertical branch and quite obvious pyramidal menton.

The masculine M36 skeleton, evidencing a tall stature (174 cm), has also some east-Europoid characters (expressed especially at the level of the face), being quite similar to the skeleton found out at Pietriș-Bârlad - M4 (Botezatu et al. 1973: 3–13). Nordoid elements are also to be observed in some skeletons exhumed without a skull, namely M17, M45, M56 – masculine, and M40 – feminine, which are characterized by thinness and tall stature (170 cm and, respectively, 160).

As to the characteristics specific to the *Mediterranoid* forms, they are to be observed in a more reduced number of skeletons. More than that, the *Mediterranoid* type occurs in only one single case: the feminine M41 skeleton, which keeps, however, some proteuropoid elements (*i.e.*, relative robustness), so that mention may be made here of a proto-*Mediterranoid* type (found at Polocin, as well).

Also, in the case of 3 other skeletons (with unrecoverable skulls), *i.e.*, M7 and M15 – masculine, and M12 – feminine (a double tomb in which a child had been also buried), one should mention only the presence of some Mediterranean elements (extremely delicate, with supra-average stature – 168, in the first two and moderate – *i.e.*, 155 –, in the last). Besides all these typological components, a feminine skeleton – M39 (again from a double tomb of an adult woman and of a baby under 1 year) should be mentioned, with characteristics corresponding to a Dinaroid type, as follows: the skull is brachicrane (82.55 u.i.) spheroid–romboid in shape, tall–hipsicrane and acrocrane (75.51 and 86.61 u.i.), with large and flattened occiput and a forehead of the metriometope type (66.90 u.i.); at the level of the face, it was only the orbit tall–hipsicrane, that could have been recovered; the stature is between the supra-average and tall one.

All the above observations show that the same typological compounds (only the Alpine ones being absent) as at Pogonești were found, with the observation that the *Nordoid component* seems better expressed than at Polocin, occupying the first place, along with some *Mediterranoid elements*, which proves the presence of native inhabitants here, as well.

No answer has been yet found for the skeletons having no skull which, according to archaeological information, might have resulted from the discovered tombs (Mamalaucă 2007: 51–56). Mention should be nevertheless made here that 5 of them (4 masculine and 1 feminine) are tall (exceeding 170 and, respectively, 160), being relatively delicate, and thus corresponding to the Nordoid type. If considering their relatively low stature (middle or below, *i.e.*, 155 and 151 cm) and their delicate appearance, they might be attributed to some Mediterranean type. However, in the absence of the cephalic skeleton, special care should be taken prior to attributing certain elements to an anthropological type or another.

CONCLUSIONS

Both cemeteries provided small, unsuitably preserved series which do not reflect the anthropological structure of the population having lived in their vicinity, but only of the groups of exhumed individuals. That is why final conclusions on the anthropological structure of such populations could be drawn only after a thorough analysis of all materials digged out from the two cemeteries, corroborated with archaeological data. On the basis of the above (relatively scarce) information, one may nevertheless assert that both osteological series (partially exhumed) evidence a certain phenotypical polymorphism (which had been actually met in other craniological series of the IVth century), within which either the Mediterranean types or its elements are prevailing. Besides them, some Nordoid components – of minority in the group of Polocin and more frequent at Pogonești – may be noticed. As secondary elements, one might mention the ones characteristic

for a Dinaroid type (present in both groups of populations with only one case, each) as well as some Alpine ones, superposed over a Mediterranean background (being present only in the Polocin group).

As to the frequency of the Mediterranean components occurring in the two groups, they are of majority and they might be attributed to the autochthonous population – if considering that, from the oldest Neolithic up to now, **the Mediterranean types constituted (besides the proto-Europoid ones)** the basic fund, of majority, of the populations having lived on our territories.

Equally, the funeral practices met in the Polocin cemetery (inhumation being predominant, although incineration had been also found out), along with the mortality values recorded – covering all groups of age – support the idea of the stable, sedentary life of such community, whose main occupations were agriculture, animal breeding and hand-made goods (ceramics, especially). The offerings found in almost all tombs (of children, mostly), representing animal rests of sheep, bovines and porcine, support the above-mentioned idea on the specific occupations of the Polocin community. At Pogonești, where – as to the phenotypical aspect – the Nordoid component seems to prevail (which explains the predominant inhumation ritual of burial, as well), the number of tombs sheltering offerings is more reduced, the bovine rests being of majority, besides other two species absent at Polocin – *i.e.*, the dog and the horse. One should also remind here the fact that, in this cemetery, most tombs are of adult or grown-up people, which permits the hypothesis of a possible settlement, here, of a migrating (perhaps Gothic) group which, in the beginning lived as an isolated community in the vicinity of the native population of Polocin, with their own space for burring their dead ones and within which, later on in time, as a result of a prolonged contact with the natives (mixed marriages – why not) have been buried some of the latter. Up to an exhaustive digging of the two cemeteries this remains, of course, a mere hypothesis and nothing more.

As to the ethnic origin of the Nordoid types, this might be either Germanic (as groups of Germans did live on our territory in the IVth century) or autochthonous, with phylogenetic origin, similar to the Mediterranean ones, or of the Cro-Magnon type – which have also occurred in all historical periods. That is why; no precise ideas may be put forward as to the Nordoid type of some Germanic populations. Obviously, the presence of the various anthropological types identified within a population should be analyzed on the basis of the data provided by the necropole, the more so in the case in which the exhumation operations had not been exhaustive.

The possible comparisons and analogies between the series taken into study and other synchronous series of the same area (Valea Seacă, Bogdănești), will be possible only after the finalization of archaeological diggings in the two necropolises.

Table 1

Mortality ratios on sexes and for some IVth century populations in the Vaslui district

Groups of age	Sex	Childrens (0–14 years)		Teen-agers (14–19 years)		Adults (20–30 years)		Maturus (30–60 years)		Seniles (60–x years)	
		N	%	N	%	N	%	N	%	N	%
Necropoles											
Polocin	M	26	53.05	2	4.08	3	6.12	7	14.28	–	–
	F			3	6.12	3	6.12	5	10.20	–	–
Total (N = 49)		26	53.05	5	10.20	6	12.24	12	24.48	–	–
Pogonești	M	2	7.69	1	3.84	1	3.84	9	34.61	2	7.69
	F			–	–	4	15.38	7	26.92	–	–
Total (N = 26)		2	7.69	1	3.84	5	19.23	16	61.53	2	7.69
Valea Seacă	M	40	30.30	1	0.75	8	6.06	40	30.30	4	3.03
	F			2	1.51	14	10.60	23	17.42	–	–
Total (N = 132)		40	30.30	3	2.26	22	16.16	63	47.72	4	3.03
Bogdănești (N = 59)			22%		5.1%		5.1%		30.5 M 20.3F	–	–

Table 2

Average life time of the groups of populations under study

Necropoles	Polocin	Pogonești	Valea Seacă	Bogdănești
0 - x years	20.9	38.7	29.2	31.6
Males 20-x years	41.7	46.6	41.9	42.3
Females 20-x years	36.1	39.5	36.7	42.8

REFERENCES

- Alexeev V P, Debetz G F 1964, *Kranometria*, Nauka, Moskva
- Botezatu D, Fedorovici C 1973, *Caracterizarea antropologică a unor schelete aparținând culturii Sântana de Mureș – Cerneahov din Moldova*, St cerc antropol, **10**, p 3–13
- Botezatu D, Miu Georgeta, Cantemir P 1983, *Aspects paleodemographiques et anthropologiques de la population de Valea Seacă (Bârlad) appartenant a la culture Sântana de Mureș-Cerneahov*, Ann Roum Anthropol, **20**, p 17–26
- Botezatu D, Miu Georgeta, Cantemir P 1987, *Cercetări antropologice asupra populației de la Bogdănești (jud Vaslui) datând din sec IV–V d H*, Acta Musei Meridionalis, p 91–108

- Botezatu D 2001, *Studiul antropologic, paleodemografic și paleopatologic al scheletelor din necropola de la Mihălășeni (jud Botoșani) datând din sec IV-V d Ch*, Hierasus, **XI**, p 131–484
- Breitinger E 1938, *Zur Brechung der Körperhohe aus den langen Gliedmassenknöchen*, Anthrop Anz, **14**, p 249–274
- Eickstedt E v 1937–1943, *Rassenkunde und Rassengeschichte der Menschheit*, Stuttgart
- Mamalaucă M 2007, *Săpăturile arheologice în necropola de secol IV de la Pogonești-Ivești*, Acta Musei Tutovens, **II**, p 51–56
- Manouvrier L 1893, *La détermination de la taille d'après les grands os des membres*, Mém La Soc D'Anthrop de Paris, **4**, p 347–402
- Martin R, Saller K 1957–1966, *Sehrbuch der Anthropologie in Systematischer Darstellung*, Stuttgart, p 429–597
- Miu Georgeta, Antoniu S, Botezatu D 1981, *Contribuții la cunoașterea structurii antropologice a populației din necropola de la Hănești („La Movilita”), aparținând culturii Sântana de Mureș-Cerneahov*, St cerc antropol , **18**, p 3–8
- Miu Georgeta, Botezatu D, Cantemir P 1988, *Contribuții la studiul antropologic al populației înhumate descoperite la Barcea (jud Galați), aparținând culturii Sântana de Mureș-Cerneahov*, St cerc antropol , **25**, p 3–9
- Miu Georgeta, Botezatu D 1991, *Considerații asupra caracteristicilor paleodemografice la unele populații care au trăit pe teritoriul patriei noastre în sec III–IV d H*, St cerc antropol , **28**, p 13–18
- Necrasov Olga, Cristescu Maria 1962, *Caracterizarea antropologică a unui schelet de la Erbiceni de la sfârșitul sec al IV-lea e n*, Arheolog Moldovei, **I**, p 219–223
- Nicolăescu-Plopșor D 1967, *Contribuții paleoantropologice la rezolvarea unor probleme istorice privind perioada migrației popoarelor în spațiul carpato-dunărean*, Rev Muzeelor, **IV** (2), p 101–110
- Olivier G 1960, *Pratiques anthropologiques*, Vigot Frères, Paris, p 115–269
- Teodor Gh D 1989, *Regiunile est-carpătice ale Daciei în secolele IV–IX e n*, Symposia Thracologica, **7**, p 198–212
- Trotter M, Glesser G C 1958, *A re-evaluation of estimation of stature based on measurements of stature taken during life and of long bones after death*, Am J Phys Anthropol , **16** (1), p 79–123

“Fr I Rainer” Institute of Anthropology,
Iași Department, antropologieiasi@yahoo.com

BEHAVIORAL IMPLICATIONS OF THE MUIERII 1 EARLY MODERN HUMAN SCAPULA

ERIK TRINKAUS

Department of Anthropology, Campus Box 1114,
Washington University, Saint Louis MO 63130, USA

The emergence of the Upper Paleolithic has been seen at a watershed in terms of human projectile technology, with the appearance of abundant organic and lithic spear points relative to the Middle Paleolithic, and associated changes in human upper limb anatomy related to throwing. An analysis of the Muierii 1 Early Upper Paleolithic (EUP) scapula, in conjunction with arm remains from Mladeč, indicates that these EUP humans do not show the upper limb changes associated with projectile throwing. The nature of the habitual spear use patterns in the EUP should therefore be reassessed.

INTRODUCTION

It has long been maintained that the emergence of the Upper Paleolithic, and in particular the appearance of the Aurignacian with its relative abundance of polished antler and bone projectile points, heralded a significant expansion of human projectile technology. Although a significant shift in the humanly-derived faunal profiles of Early Upper Paleolithic versus Middle Paleolithic sites has been hard to document, it has been suggested that this shift in projectile technology involved some combination of greater distance (and hence safety) of the hunters from their prey and possibly a sufficient increase in hunting returns to enable an increase in the social allocation of subsistence labor (Churchill and Rhodes, n.d.a).

At the same time, the dearth of securely dated human upper limb remains from the Early Upper Paleolithic has prevented an adequate assessment of whether the changes in human upper limb morphology evident between Middle Paleolithic Neandertals and Middle Upper Paleolithic (MUP) (Gravettian *sensu lato*) humans were present in the Early Upper Paleolithic (EUP). The arm bones from Mladeč provide a mosaic impression (Trinkaus et al., 2006), but they have not been analyzed from this perspective. It is in this context that the Muierii 1 right scapula, found half a century

ago (Gheorghiu and Haas, 1954) but only recently recognized as securely of EUP age (Păunescu, 2001; Olariu et al., 2005; Soficaru et al., 2006), takes on importance.

PEȘTERA MUIERII AND THE MUIERII 1 SCAPULA

The Muierii 1 human remains were found in the Galeria Musteriană of the Peștera Muierii, near Baia de Fier, Gorj County, Romania (45° 11' N, 23° 46' E). An original direct AMS radiocarbon date on a sample from the Muierii 1 scapula and tibia (LuA-5228) provided an age of $30,150 \pm 800$ ^{14}C BP [$35,150 \pm 908$ cal BP following CalPal (www.calpal.de)] (Olariu et al., 2005), which is statistically the same as the direct date (OxA-15529) on the Muierii 1 cranium of $29,930 \pm 170$ ^{14}C BP ($35,257 \pm 259$ cal BP) (Soficaru et al., 2006). Both of these dates are similar to the date (OxA-15554) on a *Megaloceros giganteus* molar of $30,060 \pm 280$ ^{14}C BP ($35,367 \pm 318$ cal BP) from the same stratigraphic depth as the earlier Upper Paleolithic archeological remains in the adjacent Galeria Principală (Soficaru et al., 2006). The Muierii 1 scapula therefore dates securely to the EUP of southeastern Europe, even though it was relatively late in that archeological phase and close to the subsequent MUP (Chirica et al., 1996).

As previously noted (Soficaru et al., 2006), the Muierii 1 cranial and mandibular remains are morphologically overwhelming those of an early modern human, with a large suite of derived (Trinkaus, 2006a) modern human characteristics. They are unusual only in exhibiting one cranial feature and a couple of mandibular aspects that are absent from probably ancestral Middle Paleolithic early modern humans (see also Trinkaus, 2007).

The right scapula associated with the Muierii 1 cranium and mandible (Gheorghiu and Haas, 1954; Soficaru et al., 2006) consists of the lateral spine with little of the dorsal surface, almost all of the glenoid fossa, the axillary border almost to the cranial end of the teres major surface, and minimal adjacent portions of the infraspinatus and subscapularis surfaces (Fig. 1). The acromion process is absent, the corocoid process retains only its base, the spine was broken about half of the distance to the vertebral border, and little of the supraspinatus surface remains. As such, the Muierii 1 scapula presents morphological data principally on the glenoid fossa, the axillary border, and to a lesser extent the lateral spine. It has no pathological alterations.

The two principal morphological aspects preserved on the Muierii 1 scapula are its axillary border and its glenoid fossa. Both of these regions have been shown to exhibit significant changes, at least in frequency distributions, between the Middle Paleolithic and the MUP.

COMPARATIVE MORPHOLOGY OF THE MUIERII 1 SCAPULA

The Axillary Border. The Muierii 1 axillary border (Figs. 1 and 2) has a prominent dorsal ridge, which is also the most lateral portion of the border. The lateral surface slopes dorsolateral to ventromedial, and it has a strong lateral crest that runs caudally down the middle of the lateral surface. The more prominent lateral sulcus is between the lateral crest and the dorsal ridge. Ventrally, the border then rounds onto the subscapularis surface, especially along the cranial 10–11 mm of the border. Given this, the slope of the lateral axillary border resembles the ventral sulcus pattern form of Eickstedt (1925), but the clear mid-lateral position of the lateral crest fits his bisulcate pattern and the more prominent dorsal ridge approaches the dorsal sulcus pattern. Using the 7-part scheme of Churchill (1994), it best confirms to his category 5, which is normally subsumed into the bisulcate pattern.

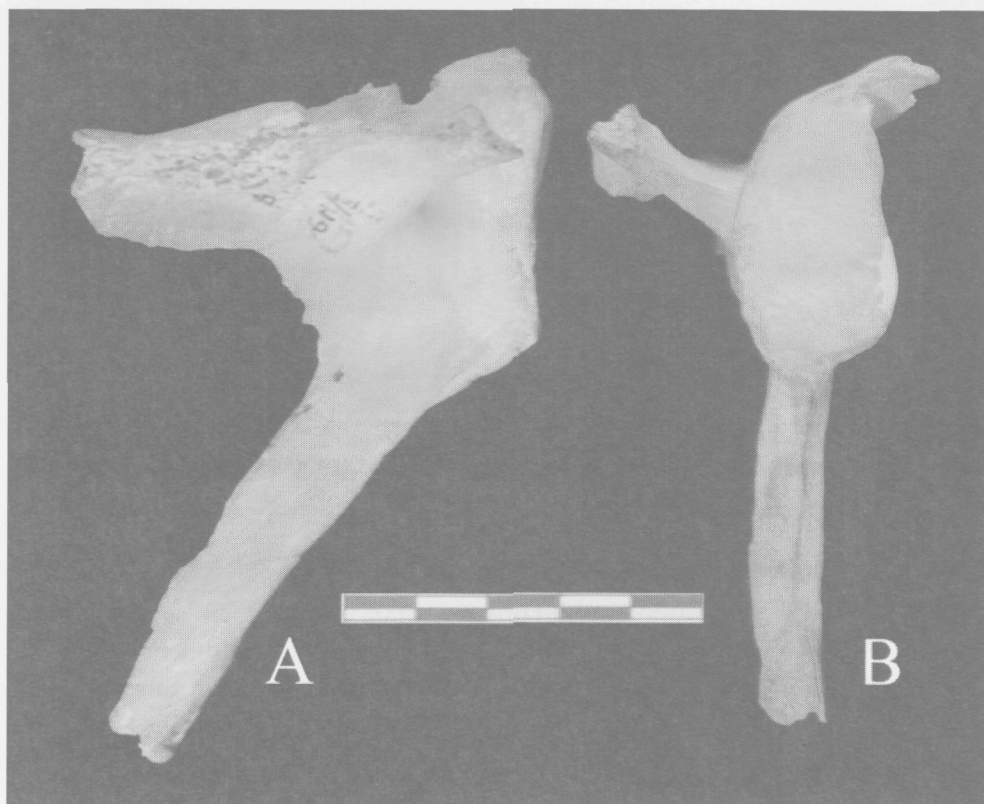


Figure 1. A. Dorsal view of the Muierii 1 right scapula.
B: lateral view of the Muierii 1 right scapula. Scale in centimeters.

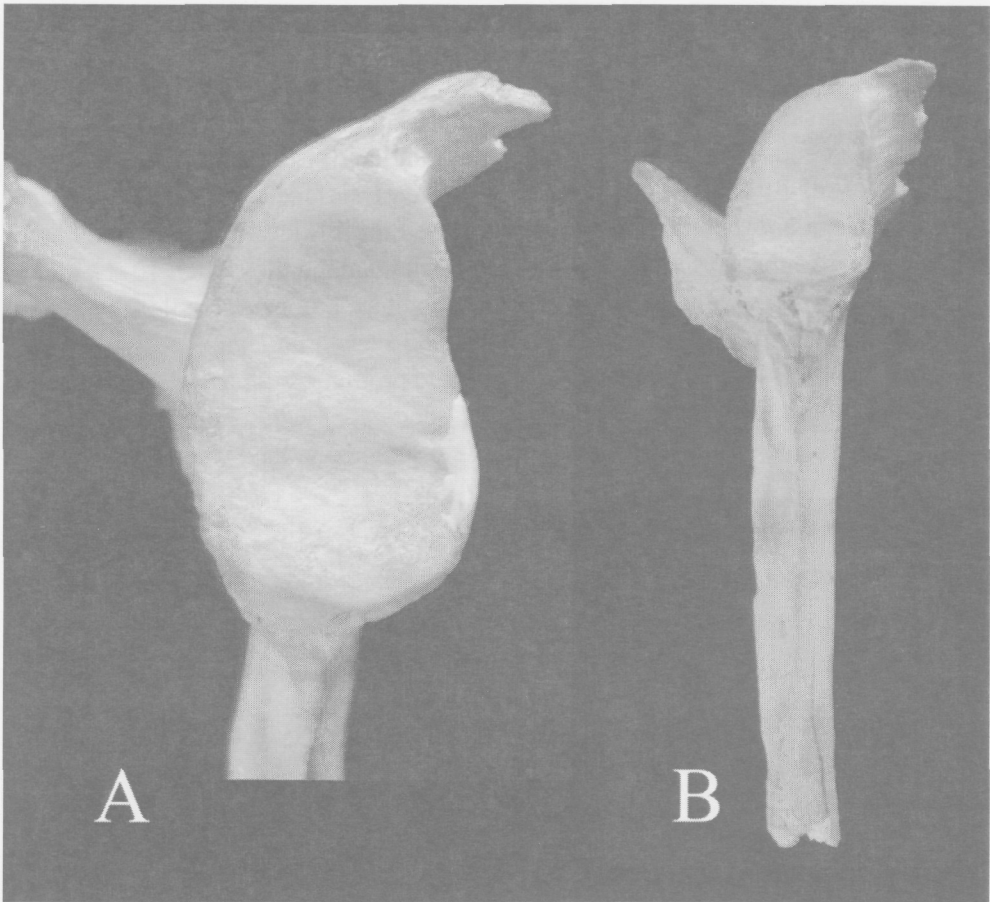


Figure 2. A; Lateral view of the Muierii 1 right glenoid fossa. The missing ventral margin has been restored in plasticene. B: Lateral view of the Muierii 1 right axillary border. Not to the same scale.

The frequency distributions of these traits (Table 1) indicate that the ancestral pattern is the ventral sulcus one (in both Early Pleistocene *Homo*, as well as earlier humans and most other primates) (Trinkaus, 2008), the dorsal sulcus pattern becomes derived within the Neandertal lineage, and the bisulcate pattern is most common form among Middle and Upper Paleolithic early modern humans. It is only among recent humans that the ventral sulcus pattern again becomes the dominant one. The bisulcate pattern seen on Muierii 1 occurs in all of the later Pleistocene and recent human samples, and it is therefore not particularly diagnostic. It is nonetheless more common among early modern humans than among the Neandertals.

Table 1

Distributions of axillary border morphology across samples of Pleistocene *Homo* and recent human samples. The recent humans are arranged by ascending frequency of the dorsal sulcus and then bisulcate patterns.

Axillary Border Pattern ¹	Ventral Sulcus	Bisulcate	Dorsal Sulcus	N
Early Pleistocene <i>Homo</i> ²	100%	0.0%	0.0%	2
Middle Pleistocene Europe ³	0.0%	0.0%	100%	4
Neandertals OIS 6–3	1.9%	29.6%	68.5%	27
Qafzeh-Skhul OIS 5	20.0%	80.0%	0.0%	5
Middle Upper Paleolithic	14.0%	64.0%	22.0%	25
Recent Humans				
Euroamericans – Albq. / St. Louis ⁴	97.8%	2.2%	0.0%	45
Aleutian Islanders ⁴	95.6%	4.4%	0.0%	46
Amerindians – Puebloan ⁴	90.0%	10.0%	0.0%	40
Amerindians – Pecos ⁵	86.6%	13.4%	0.0%	119
Afroamericans – St. Louis ⁴	86.0%	14.0%	0.0%	50
Europeans – Portugal ⁶	67.3%	32.7%	0.0%	124
Europeans – Serbia ⁵	75.8%	23.8%	0.4%	120
Amerindians – Arikara ⁷	62.6%	36.7%	0.6%	198
Europeans – Austria ⁸	85.6%	13.4%	1.0%	97
Afroamericans – Cleveland ⁹	74.0%	25.0%	1.1%	265
Euroamericans – Iowa ⁹	80.8%	16.8%	2.4%	285
Australians ⁸	84.8%	9.1%	6.1%	66
Europeans – Germany ¹⁰	65.3%	21.9%	6.4%	171
Africans – Khoisan ⁸	64.6%	26.8%	8.5%	82
Europeans – Scotland ¹¹	67.0%	21.4%	11.6%	56

¹ The axillary border morphology is divided into three general categories following Eickstedt (1925) so as to include as many comparative samples as possible. The more detailed systems of Eickstedt (1925) and the seven-part system of Churchill (1994) better characterize the continuous variation of the region, but their finer distinctions are sometimes difficult to make on fragmentary scapulae.

² KNM-WT 15000 (Walker and Leakey, 1993), Dmanisi 4166 (Jashashvili, 2005).

³ Atapuerca-SH (Carretero et al., 1997).

⁴ Data from Churchill (1994); his categories 1 and 2 are combined as “ventral,” 3 to 5 as “bisulcate,” and 6 and 7 as “dorsal.”

⁵ Data from Trinkaus (1977).

⁶ Data from Carretero et al. (1997).

⁷ Data from Dittner (1976).

⁸ Data from Eickstedt (1925).

⁹ Data from Franciscus and Schoenebaum (2000).

¹⁰ Data from Chambers (1992).

¹¹ Data from Moran and Chamberlain (1997).

The Glenoid Fossa The Muierii 1 right glenoid fossa is almost complete, having sustained minor erosion to the caudal half of the ventral margin (Figs. 1 and 2). Given the preserved contour of the glenoid fossa and of the adjacent ventral bone (see Fig. 2B), it is possible to infer the original contour; the restoration employed here should be within ~0.5 mm of the original bone contour, and unless the glenoid fossa had an unusual ventral bulge, it should err on the side of making the glenoid fossa breadth too large. It has a glenoid articular height of 34.3 mm and a restored glenoid fossa breadth of 21.5 mm. These values were formerly (Soficaru et al., 2006) compared using a glenoid index (62.7), which indicates a relatively narrow glenoid fossa, similar to those of the Neandertals and at the bottom of the range of variation of MUP and recent human right scapulae. However, there are limitations to the use of indices, since they rarely adequately remove the effects of size.

Consequently, the Muierii 1 glenoid diameters were compared to those of recent and fossil *Homo* scapulae using regression and resultant residuals. Four recent human samples, recent Euroamericans, recent Afroamericans, late prehistoric North American Amerindians, and early historic Aleutian Islanders (Churchill, 1994, pers. comm.), were employed to provide a modern human baseline. To these samples were added a sample of western Eurasian MUP humans (from oxygen isotope stage (OIS) 3) (N = 16), a geographically similar sample of OIS 5–3 Middle Paleolithic Neandertals (N = 8), and a sample of Early (KNM-WT 15000, D4166) and Middle (AT-SH 794, AT-SH Sc1) Pleistocene *Homo* scapulae. Additional data are included for the OIS 5 Middle Paleolithic early modern humans, even though neither of their right scapulae presents a complete glenoid breadth. Given bilateral differences in the glenoid proportions of at least Late Pleistocene humans (Trinkaus, 2006b), only right scapulae were employed.

To assess relative glenoid breadth (GAB), it was regressed against glenoid height (GAH) for the pooled recent human sample (N = 229), producing a reduced major axis (RMA) regression of: $GAB = 0.773 \times GAH - 1.80$, $r = 0.830$. Vertical linear residuals were computed from this regression for the recent and fossil human scapulae. However, this approach did not fully remove the effect of size, since the resultant residuals for the pooled recent human sample were significantly negatively ($P < 0.001$) correlated with GAH (residual = $4.57 - 0.132 \times GAH$, $r = -0.291$). From this correlation it is evident that GAH, which is correlated with overall upper limb articular dimensions (Churchill and Trinkaus, 1990), increases with body size at a faster rate than GAB. The residuals were therefore adjusted using this least squares regression (LSR), to produce a slope and a correlation coefficient of <0.001 ($P > 0.999$) or an essentially horizontal distribution of residuals relative to GAH for the pooled recent human sample. It was then possible to compare relative glenoid fossa breadth across the samples (Fig. 3).

The Muierii 1 residual value of -3.27 mm is towards the bottom of the genus *Homo* ranges of variation. It is below those of all of the Euroamerican, Afroamerican and Amerindian scapulae, as well as all of the MUP scapulae. It is matched by a few ($N = 3$) of the Aleutian Islanders but nonetheless falls below 98.7% ($N = 229$) of the recent humans. The one MUP specimen which approaches it is Barma Grande 2; its glenoid index (65.0) approaches the Muierii 1 index, but its adjusted residual (-2.40 mm) is substantially higher, since the Muierii 1 GAH is approximately average in size whereas the Barma Grande 2 GAH is among the largest in the sample.

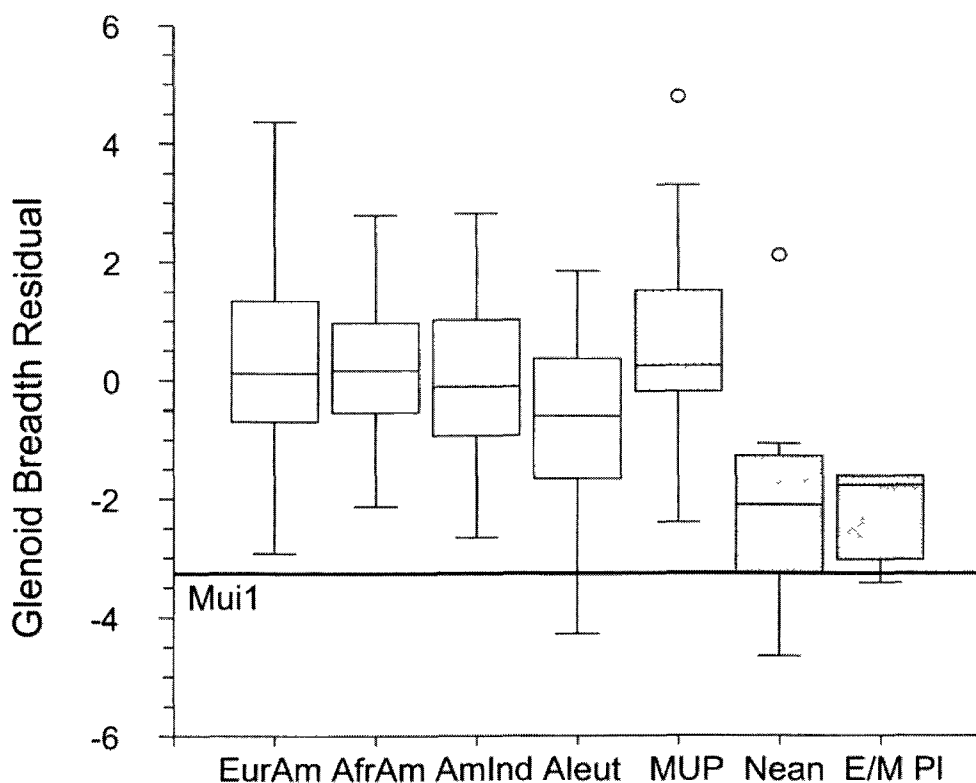


Figure 3. Box plot of the adjusted residuals for glenoid articular breadth versus glenoid articular height for recent and Pleistocene *Homo* right scapulae. EurAm: Euroamericans; AfrAm: Afroamericans; AmerInd: Puebloan Amerindians; Aleut: Aleutian Islanders; MUP: Middle Upper Paleolithic humans; Nean: OIS 5–3 Neandertals; E/M PI: Early and Middle Pleistocene *Homo*. Mui 1: horizontal line for the value (-3.266) for the Muierii 1 residual.

The Muierii 1 GAB residual is also within the range of the Neanderthal ($N = 8$) and the earlier *Homo* ($N = 4$) scapulae, although only three of them (AT-SH Sc1,

Krapina 129 and Spy 2) are as relatively narrow as Muierii 1. The one Neandertal with a relatively broad fossa is La Ferrassie 1. Muierii 1 therefore has an exceptionally narrow glenoid fossa for an otherwise anatomically modern human, and it falls among Pleistocene archaic *Homo*.

Two Middle Paleolithic early modern humans retain right glenoid fossae, Qafzeh 8 and 9, but both of them sustained damage to their glenoid borders, especially with respect to their breadths. They appear to have had relatively narrow glenoid fossae, and adjusted residuals using estimated fossa breadths are -3.09 mm and -1.27 mm respectively. The lower of these values, that of Qafzeh 8, is based on the more tenuous estimation of glenoid breadth. The other value falls within the overlap zone of the MUP and Neandertal samples, but closer to the Neandertal distribution. These data therefore suggest narrow glenoid fossae for these Middle Paleolithic modern humans as well.

There is some variation across the recent human samples, with the Aleut sample having slightly lower residuals than the other three samples (Wilcoxon $P = 0.020$), and there is a tendency for males to have relatively broader glenoid fossae than females (Wilcoxon $P = 0.011$). In the smaller MUP sample, there is no difference between the sexes (Wilcoxon $P = 0.910$). It is not possible to assess sex differences in archaic *Homo*, but there is no effect of size (indicated by GAH) in the pooled archaic *Homo* sample ($LSR P_{slope} = 0.378$).

FUNCTIONAL IMPLICATIONS OF THE MUIERII 1 SCAPULA

Both of these scapular features have been related to musculoskeletal function, the former to muscular hypertrophy of the shoulder region and the latter to habitual degrees of glenohumeral rotation. As such, they may have implications for EUP upper limb behavior.

Axillary Border Form. It was proposed (Trinkaus, 1977, see Odwak, 2006) that the development of the dorsal ridge of the axillary border was related to teres minor hypertrophy and by extension (through scapulohumeral and thoracohumeral muscular antagonists and synergists) to generalized upper limb muscular hypertrophy. This hypothesis has since been retracted (Churchill and Trinkaus, 1990), and subsequent evaluations of variation in axillary border morphology relative to upper limb skeletal hypertrophy (Churchill, 1996; Franciscus and Schoenebaum, 2000; Odwak, 2006) have either found no functional relationship or a weak association of cross-sectional thickness with the bisulcate pattern. Moreover, developmental assessments of the patterns (Busby, 2006; Trinkaus, 2006c, 2008) have shown relatively early differentiation of the axillary border into its diverse forms, prior to ages when hypertrophy is likely to have been influential. As a result, it is currently unclear whether the variation is strictly epigenetic (*sensu* Berry and Berry, 1967) or may have a secondary functional component. It is

unlikely to reflect changes in upper limb behavior among EUP Europeans, given these considerations and the presence of the bisulcate pattern in all Late Pleistocene and recent human samples (Table 1).

Glenoid Fossa Breadth. In contrast, the relatively narrow glenoid fossa of Muierii 1, with no evidence of osteoarthritic degeneration, implies that this individual did not habitually engage in activities that required elevated loading of the glenohumeral joint in the extremes of medial and lateral rotation. In those joint positions, excessive loads may be placed on the joint capsule, the glenoid labrum, and the rotator cuff muscles, as well as increasing joint reaction forces on the articular cartilage and subchondral bone of the glenoid fossa (Ouellette et al., 2008). Since glenoid height correlates with humeral head diameter (Churchill and Trinkaus, 1990), a reduction in glenoid breadth implies a decrease in glenoid surface area relative to humeral head size, indicating both greater pressure on the glenoid articular cartilage and subchondral bone and increased force on the glenoid labrum.

In the context of this, overarm throwing among athletes, including both Olympic javelin throwers and American baseball pitchers, engenders significant external rotation at the glenohumeral joint during the cocking phase, and then high levels of rotational torque at the joint as the humerus internally rotates during acceleration of the projectile (Howell et al., 1988; Fleisig et al., 1995; Herrington, 1998; Crockett et al., 2002; Borsa et al., 2005). The relatively narrow glenoid fossa of Muierii 1, and of earlier Pleistocene humans, suggests that their glenohumeral joints were not well accommodated to the forces implied by these activities. The simplest explanation of this pattern is that pronounced over arm throwing, although undoubtedly present, was not an habitual activity of Pleistocene humans prior to the MUP.

DISCUSSION

Archeological Issues. It has been suggested, prior to a knowledge of EUP scapular morphology, that the emergence of relatively wide scapular glenoids in the Upper Paleolithic indicated a major increase in projectile throwing behavior with the EUP (Churchill and Trinkaus, 1990; Churchill et al., 1996). This interpretation has been supported by the widespread presence of antler/bone points, as well as of lithic points that meet metric criteria for being considered effective projectile points, within the EUP and also slightly earlier in Initial Upper Paleolithic (IUP) assemblages (Peterkin, 1993; cf. Shea, 2006).

Since then the discovery of the Middle Pleistocene Schöningen spears (Thieme, 1996), and experimental evidence showing that they could be thrown as javelins (Steguweit, 1999), has implied that overhand projectile weaponry had a much greater antiquity than the Upper Paleolithic. Yet, the Schöningen spears (Thieme, 1996), as well as the Middle Pleistocene Clacton spear (Oakley et al., 1977), are large and heavy spears, and it remains unclear to what extent they were effective throwing versus thrusting spears.

Similarly, during the OIS 5-3 Middle Paleolithic there is little evidence for light-weight, effective, throwing spears. The Lehringen wooden spear is large and heavy (Thieme et al., 1985), and distinctive bone points are extremely rare (Wagner, 1983; Bolus and Conard, 2006). There is considerable evidence for the hafting of lithic points within the Middle Paleolithic (Shea, 1993; Boëda et al., 1999; Hardy et al., 2001), and both damage patterns (Shea, 1993; Hardy et al., 2001) and a Levallois point embedded in an equid cervical vertebra (Boëda et al., 1999) support the use of Middle Paleolithic points as hunting weapons. However, functional considerations of tip size throughout Middle Paleolithic assemblages (Shea, 2006) make it unlikely that these spears were widely used as projectiles. Although they could have been thrown with sufficient force to produce fatal wounds in prey (Boëda et al., 1999), it appears more likely that most of these Middle Paleolithic spears were used as close quarter thrusting spears or propelled rather short distances. In this, it should be emphasized that these considerations apply to Middle Paleolithic assemblages, whether they are associated with late archaic humans or early modern humans.

There is an emergence of pointed lithics within the western Eurasian IUP, whose reduced tip dimensions in particular support their use as projectile points (Peterkin, 1993; Goring-Morris and Belfer-Cohen, 2006; Shea, 2006). Moreover, undoubted antler/bone spear points are widespread in the western Eurasian EUP (Knecht, 1993a; Liolios, 2006; Goring-Morris and Belfer-Cohen, 2006; Bolus and Conard, 2006). They are also known from the Galeria Principală in the Peștera Muierii (Gheorghiu et al., 1954; Păunescu, 2000) and occur in other Romanian Aurignacian assemblages (Chirica et al., 1996; Dobrescu, 2003; Chirica and Noiret, 2006). Given their size, shape and proximal wear patterns, it has been inferred that they were hafted onto spear shafts and used primarily as projectiles (e.g., Knecht, 1993b). The functional dimensions of their tips in particular support such an inference (Peterkin, 1993). Distinctive lithic projectile points appear to be absent from the Aurignacian, although based on damage patterns some bladelets may have been hafted to serve this purpose (O'Farrell, 2005), and there are small pointed blades that may have served as points. Similar lithic and organic projectile points continue, with further elaborations, through the MUP, although definite spear throwers (atlatls) do not appear until the end of the MUP (Cattelain, 1989).

Based on these archeological considerations, one would argue that the use of projectiles for hunting was infrequent in the Lower and Middle Paleolithic, although it undoubtedly existed, perhaps primarily using wooden spears such as the Schöningen ones. It would then be inferred to have increased markedly with the IUP and especially with the EUP given the relative abundance of both lithic and organic points of appropriate size and proportions. It would then have continued to improve through the Upper Paleolithic, with further refinements in point technology and eventually the development of the spear thrower.

Human Biological Issues. As argued by Churchill and Rhones (n.d.a,b), variation in human upper limb functional anatomy tracks relatively closely with

this archeologically inferred pattern. This applies particularly to ulnar supinator crest development (for elbow stabilization), deltoid tuberosity size (for shoulder rotation), and scapular glenoid breadth (for glenohumeral integrity; see above), with humeral torsion asymmetry providing additional support. However, in their comparisons Churchill and Rhodes did not make a distinction between EUP and MUP human remains. Doing so changes the perspective on the EUP.

As detailed here, the Muierii 1 scapular glenoid maintains the narrow breadth of Middle Paleolithic and earlier humans. It lacks the transverse enlargement of the MUP humans. In addition, the Mladeč upper limb remains reinforce this pattern (Trinkaus et al., 2006). The Mladeč 23 and 24 humeri have weakly marked and narrow deltoid tuberosities, similar to those of Middle Paleolithic humans. The index of deltoid breadth (9.0 mm) to articular length (~366 mm) for Mladeč 24 (~24.6) is below average for Middle Paleolithic values and separate from MUP indices (Churchill and Rhodes, 2006). The larger but less complete Mladeč 23 humerus has a minimally larger deltoid breadth (10.9 mm). And the Mladeč 25c ulna has little development of the supinator crest. The behavioral implications of the Muierii 1 glenoid fossa at therefore reflected as well in the few other available EUP upper limb remains.

In the context of this, does the clear similarity of the Muierii 1 glenoid fossa proportions (and of the Mladeč deltoid and supinator insertions) to those of earlier humans imply that the abundance of predatory projectiles in the EUP is more apparent than real? Are the functional inferences from point morphology sufficient to indicate a preponderance of projectile technology? Or are we looking more at a significant increase in spear design and point penetration without the advantages of longer distance predation?

The advantages of being able to effectively throw a lethal projectile are several (see also Churchill, 1993; Churchill and Rhodes, n.d.a). They alleviate the need to closely stalk flighty prey. They make available otherwise elusive prey. They eliminate the danger of close contact with large and dangerous prey. Through these effects, they might permit one individual to have a greater success rate, hence reducing the need for all individuals in a social group to hunt. Were these subsistence patterns present in the EUP (and IUP) to a significantly greater extent than in the Middle Paleolithic, or did they only coalesce into a consistent pattern later in the Upper Paleolithic?

The Muierii 1 scapula and Mladeč arm bones would suggest the latter interpretation. This would hold whether the shift in relative glenoid breadth is seen as an epigenetic characteristic or one that could be developmentally modified. If the former, one would have to argue for sufficient selection to change the glenoid pattern by the MUP, perhaps starting during the EUP. Yet, joint size has some degree of plasticity relative to habitual joint reaction forces and excursion ranges, as is indicated by both correlations of femoral head size to adolescent body mass (Ruff et al., 1991) and talocrural alterations with habitual squatting (Trinkaus,

1975). In this latter case, one would expect to see a closer association between glenoid proportions and behavior, albeit with considerable variation. The modest sexual differences among the recent humans would support such an inference, although their absence in the small Pleistocene samples need not be relevant, given the inherent variability in any developmentally plastic trait and the likely participation of all individuals in critical subsistence activities (Trinkaus et al., 2001). The variable hypertrophy of the deltoid and supinator insertions is developmentally plastic, even if only generally related to muscle size (Jurmain, 1999).

It is nonetheless recognized that there are limitations in making broad inferences from one scapula of one individual and a couple of isolated arm bones. They could be anomalous and/or from the non-dominant arm. The functional linkage between relative glenoid breadth and habitual shoulder loading positions may be weaker than implied here, especially if the extreme positions employed by modern throwing athletes are not representative of Pleistocene spear throwers. All muscle insertions exhibit variation and the associations between tuberosity and crest development and muscle mass are only general.

Nonetheless, any version of overarm spear throwing with sufficient force to be accurate and lethal is likely to involve considerable glenohumeral joint reaction force, shear stress across the labrum and capsule, and peak muscle forces. If one is going to argue for widespread use of overarm spear throwing in the Aurignacian/EUP, with its implications for hunter safety and hunting efficiency, it would be nice to have it consistent with both the archeological and (albeit meager) paleontological records.

CONCLUSION

The later Aurignacian early modern human from Peștera Muierii, Romania exhibits a scapular morphology that appears to be at odds with the archeological evidence for abundant Early Upper Paleolithic projectile use, and it is supported in this by three of the Mladeč arm bones. Perhaps the habitual pattern of spear use and hence hunting behavior of at least European Aurignacian humans needs to be reconsidered. As with earlier Pleistocene humans, they probably used over arm thrown spears, but the degree to which they did this, as opposed using thrusting spears in close quarters with prey, should be reassessed.

Acknowledgments. The paper grows out of collaboration with A. Soficaru and A. Doboș to reanalyze the human remains from the Peștera Muierii. The analysis of the Muierii human remains in the Institutul de Speologie "Emil Racoviță" (Bucharest) was made possible by I. Povara, E. Stiuca, and C. Petrea and was funded by National Science Foundation Grant BCS-0509072 and Wenner-Gren Foundation Grant 7290. S.E. Churchill provided his original scapular data,

A. Doboş and J. Zilhão helped with the archeological context, and S.E. Churchill and J. Zilhão provided helpful comments. To all I am grateful.

LITERATURE CITED

- Berry A C , Berry R J 1967, *Epigenetic variation in the human cranium*, *J Anat* , **101**(2), p 361–379
- Boeda E , Geneste J M , Griggo C , Mercier N , Muhesen S , Reyss J L , Taha A , Vallada H 1999, *A Levallois point embedded in the vertebra of a wild ass (Equus africanus) hafting, projectiles and Mousterian hunting weapons* *Antiquity* , **3**, p 394–402
- Bolus M , Conard N J 2006, *Zur Zeitstellung von Geschosspitzen aus organischen Materialien im späten Mittelpaläolithikum und Aurignacien*, *Archaeol Korresp* , **36**(1), p 1–15
- Borsa P A , Wilk K E , Jacobson J A , Scibek J S , Dover G C , Reinhold M M , Andrews J R 2005, *Correlation of range of motion and glenohumeral translation in professional baseball pitchers*, *Am J Sports Med* , **33**, p 1392–1399
- Busby A M 2006 *A multivariate analysis of the ontogeny of the scapular axillary border*, *Period Biol* , **108**(3), p 365–371
- Cattelain, P 1989 *Un crochet de propulseur solutreen de la grotte de Combe-Sauniere I (Dordogne)*, *Bull Soc Préhist Franç* , **86**, p 213–216
- Carretero J M , Arsuaga J L , Lorenzo C 1997, *Clavicles, scapulae and humeri from the Sima de los Huesos site (Sierra de Atapuerca, Spain)*, *J Hum Evol* , **33**, p 357–408
- Chambers K E 1992, *Variations in morphology of the scapular border in anatomically modern Homo sapiens (abstract)* *Am J Phys Anthropol Suppl* , **14**, p 59
- Chirica V , Borzic I , Chetaru N 1996, *Gisements du paleolithique superieur ancien entre le Dniestr et la Tissa*, Helios, Iaşi
- Chirica V , Noiret P 2006, *Mitoc – Malu Galben Industrie osseuse et temoins esthetiques*, *Etud Rech Archeol Univ Liège* , **72**, p 143–144
- Churchill S E 1993, *Weapon technology, prey size selection, and hunting methods in modern hunter-gatherers Implications for hunting in the Palaeolithic and Mesolithic*, in Peterkin, G L , Bricker, M H , Mellars, P (eds) *Hunting and Animal Exploitation in the Later Palaeolithic and Mesolithic of Eurasia*, *Archaeol Pap Am Anthropol Assoc* , **4**, p 11–24
- Churchill S E 1994, *Human Upper Body Evolution in the Eurasian Later Pleistocene*, Ph D Thesis, University of New Mexico
- Churchill S E 1996, *Neandertal scapular axillary border morphology revisited (abstract)* *Am J Phys Anthropol Suppl* , **22**, p 85
- Churchill S E , Rhodes J A 2006, *How strong were the Neandertals? Leverage and muscularity at the shoulder and elbow in Mousterian foragers*, *Period Biol* , **108**(4), p 457–470
- Churchill S E , Rhodes J A n d a , *The evolution of the human capacity for “killing at a distance” The human fossil evidence for the evolution of projectile weaponry*, in J J Hublin, J J , Richards, M P (eds), *The Evolution of Hominid Diets Integrating Approaches to the Study of Palaeolithic Subsistence*, Springer, New York, (in press)
- Churchill S E , Rhodes J A n d b , *Throwing in the Middle and Upper Paleolithic Inferences from an analysis of humeral retroversion*, *J Hum Evol* (in press)
- Churchill S E , Trinkaus E 1990, *Neandertal scapular glenoid morphology*, *Am J Phys Anthropol* , **83**, p 147–160
- Churchill S E , Weaver A H , Niewoehner W A 1996, *Late Pleistocene human technological and subsistence behavior Functional interpretations of upper limb morphology*, *Quatern Nova* , **6**, p 413–447
- Crockett H C , Gross L B , Wilk K E , Schwartz M L , Reed J , O’Mara J , Reilly M T , Dugas J R , Meister K , Lyman S , Andrews J R 2002, *Osseous adapation and range of motion at the glenohumeral joint in professional baseball pitchers*, *Am J Sports Med* , **30**, p 20–26

- Dittner C B 1976, *The Morphology of the Axillary Border of the Scapula with Special Reference to the Neandertal Problem* Masters Thesis, University of Tennessee – Knoxville
- Dobrescu R 2003, *Aurignacianul din Transilvania*, Teză de doctorat, Institutul de Arheologie „Vasile Pârvan”, Academia Română, București
- Eickstedt E F von 1925, *Variationen am Axillarrand der Scapula* *Anthropol Anz*, **2**, p 217–228
- Fleisig G S, Andrews J R, Dillman C J, Escamilla R F 1995, *Kinetics of baseball pitching with implications about injury mechanisms* *Am J Sports Med*, **23**(2), p 233–239
- Franciscus R G, Schoenebaum C R 2000, *Cross-sectional metric analysis of scapular axillary border morphology in recent humans and the Krapina Neandertals (abstract)* *Am J Phys Anthropol Suppl*, **30**, p 152
- Gheorghiu A Haas N 1954, *Date privind omul primitiv de la Baia de Fier Considerații paleoantropologice*, Sesiunea Secțiunii de Științe Medicale a Academiei R P R **41**, p 641–661
- Gheorghiu A, Nicolăescu-Plopșor C S, Haas N, Comșa E, Preda C, Bombiță G, Enea G, Gheorghiu F, Iofcea S, Nicolăescu-Plopșor D, Neagoe A, Silveanu R, Surdu I 1954, *Raport preliminar asupra cercetărilor de paleontologie umană de la Baia de Fier (Reg Craiova) din 1951*, *Probl Antropol*, **1**, p 73–86
- Goring-Morris N, Belfer-Cohen A 2006, *A hard look at the “Levantine Aurignacian” how real is the taxon?* in Bar-Yosef, O, Zilhão, J (eds) *Towards a Definition of the Aurignacian* *Trabalhos Arqueologia* **45**, p 297–314
- Hardy B L, Kay M, Marks A E, Monigal K 2001, *Stone tool function at the paleolithic sites of Starosele and Buran Kaya III, Crimea Behavioral implications* *Proc Natl Acad Sci USA* **98**(19), p 10972–10977
- Herrington L 1998, *Glenohumeral joint internal and external rotation range of motion in javelin throwers*, *Br J Sports Med*, **32**(3), p 226–228
- Howell S M, Galinat B J, Renzi A J, Marone P J 1988, *Normal and abnormal mechanics of the glenohumeral joint in the horizontal plane*, *J Bone Joint Surg* **70A**, p 227–232
- Jashashvili T 2005, *Homimid Upper Limb Remains from the Palaeolithic Site of Dmanisi A Morphometrical Comparison to Taxonomical Units and Functional Interpretation* Ph D Thesis, University of Ferrara & National Museum of Georgia
- Jurmain R 1999, *Stories from the Skeleton* Gordon and Breach, Amsterdam
- Knecht H 1993a, *Splits and wedges The techniques and technology of early Aurignacian antler working*, in H Knecht, H, Pike-Tay, A, White, R (eds) *Before Lascaux The Complex Record of the Early Upper Paleolithic* CRC Press, Boca Raton, p 137–162
- Knecht H 1993b, *Early Upper Paleolithic approaches to bone and antler projectile technology*, in Peterkin, G L, Bricker, M H, Mellars, P (eds) *Hunting and Animal Exploitation in the Later Palaeolithic and Mesolithic of Eurasia*, *Archaeol Pap Am Anthropol Assoc*, **4**, p 35–47
- Liolios D 2006, *Reflections on the role of bone tools in the definition of the Early Aurignacian* in Bar-Yosef, O, Zilhão, J (eds) *Towards a Definition of the Aurignacian* *Trabalhos Arqueologia* **45**, p 37–51
- Moran A J, Chamberlain A T 1997, *The incidence of dorsal sulci of the scapula in a modern human population from Ensay, Scotland*, *J Hum Evol*, **33**, p 521–524
- Oakley K P, Andrews P, Keeley L H, Clark J D 1977, *A reappraisal of the Clacton spearpoint*, *Proc Prehist Soc* **43**, p 13–30
- Odwak H 2006, *Scapular axillary border morphology in modern humans and Neandertals*, *Period Biol*, **108**(3), p 353–364
- O’Farrell M 2005, *Etude preliminaire des éléments d’armature lithique de l’Aurignacien ancien de Brassempouy*, *ArchéoLogiques* **1**, p 395–412
- Olariu A Skog G, Hellborg R, Stenstrom K, Faarinen M, Persson P, Alexandrescu E 2005, *Dating of two Paleolithic human fossil bones from Romania by accelerator mass spectrometry*, in Olariu, A, Stenstrom, K, Hellborg, R (eds) *Applications of High Precision Atomic and Nuclear Methods*, Editura Academiei Române, Bucharest, p 222–226

- Ouellette H, Labis J, Bredella M, Palmer, Sheah K, Torriani M 2008, *Spectrum of shoulder injuries in the baseball pitcher*, Skel Radiol, DOI 10.1007/s00256-007-0389-0
- Păunescu A 2000, *Paleoliticul și mezoliticul din spațiul cuprins între Carpați și Dunăre* Editura AGIR, Bucharest
- Păunescu A 2001, *Paleoliticul și mezoliticul din spațiul transilvan* Editura AGIR, Bucharest
- Peterkin G L 1993, *Lithic and organic hunting technology in the French Upper Palaeolithic*, in Peterkin, G L, Bricker, M H, Mellars, P (eds) *Hunting and Animal Exploitation in the Later Palaeolithic and Mesolithic of Eurasia*, Archaeol Pap Am Anthropol Assoc, 4, 49–67
- Ruff C B, Scott W W, Liu A Y C 1991, *Articular and diaphyseal remodeling of the proximal femur with changes in body mass in adults*, Am J Phys Anthropol, 86, p 369–396
- Shea J J 1993, *Lithic use-wear evidence for hunting by Neandertals and early modern humans from the Levantine Mousterian*, in Peterkin, G L, Bricker, M H, Mellars, P (eds) *Hunting and Animal Exploitation in the Later Palaeolithic and Mesolithic of Eurasia*, Archaeol Pap Am Anthropol Assoc, 4, p 189–197
- Shea J J 2006, *The origins of lithic projectile point technology evidence from Africa, the Levant, and Europe* J Archaeol Sci, 33, p 823–846
- Soficaru A, Doboș A, Trinkaus E 2006, *Early modern humans from the Peștera Muierni, Baia de Fier Romania* Proc Nat Acad Sci USA, 103(46), p 17196–17201
- Steguweit L 1999, *Die Recken von Schoningen – 400 000 Jahre Jagd mit dem Speer*, Mitt Gesellsch Urgesch, 8, p 5–14
- Thieme H 1996, *Altpaläolithische Wurfspieere aus Schoningen Niedersachsen – Ein Vorbericht*, Archaeol Korresp, 26, p 377–393
- Thieme H, Veil S, Meyer W, Moller J, Plisson H 1985, *Neue Untersuchungen zum eemzeitlichen Elefanten Jagdplatz Lehringen, Ldkr Verden*, Die Kunde, 36, p 11–58
- Trinkaus E 1975, *Squatting among the Neandertals A problem in the behavioral interpretation of skeletal morphology*, J Archaeol Sci, 2, p 327–351
- Trinkaus E 1977, *A functional interpretation of the axillary border of the Neandertal scapula*, J Hum Evol, 6, p 231–234
- Trinkaus E 2006a, *Modern human versus Neandertal evolutionary distinctiveness* Curr Anthropol, 47(4), p 597–620
- Trinkaus E 2006b, *The upper limb remains*, in Trinkaus, E, Svoboda, J A (eds) *Early Modern Human Evolution in Central Europe The People of Dolni Věstonice and Pavlov*, Oxford University Press, New York, p 327–372
- Trinkaus E 2006c, *The Krapina scapulae*, Period Biol, 108(3), p 341–351
- Trinkaus E 2007, *European early modern humans and the fate of the Neandertals*, Proc Nat Acad Sci USA, 104(18), p 7367–7372
- Trinkaus E 2008, *Kuk-Koba 2 and Neandertal axillary border ontogeny*, Anthropol Sci (in press)
- Trinkaus E, Formicola V, Svoboda J A, Hillson S W, Holliday T W 2001, *Dolni Věstonice 15 Pathology and persistence in the Pavlovian*, J Archaeol Sci, 28, p 1291–1308
- Trinkaus E, Smith F H, Stockton T C, Shackelford L L 2006, *The human postcranial remains from Mladeč*, in Teschler-Nicola, M (ed) *Early Modern Humans at the Moravian Gate The Mladeč Caves and their Remains*, Springer Verlag, Vienna, p 385–445
- Wagner E 1983, *Das Mittelpaläolithikum der Grossen Grotte bei Blaubeuren (Alb-Donau-Kreis)*, Forsch Berich Vor- Frühgesch Baden-Wuttemberg 16
- Walker A, Leakey R 1993, *The postcranial bones* in Walker, A, Leakey, R (eds), *The Nariokotome Homo erectus Skeleton*, Harvard University Press, Cambridge MA, p 95–160

Department of Anthropology, Campus Box 1114,
Washington University, Saint Louis MO 63130, USA,
trinkaus@artsci.wustl.edu

ALLELE FREQUENCIES OF 12 STR-POLYMORPHISMS IN POPULATIONS OF THE BALKANS

TANJA ARENT, H-G SCHEIL, W HUCKENBECK,
LJUDMILA EFREMOVSKA, H D SCHMIDT

Allele frequencies for twelve STRs included in the genRES[®]MPX-3 Multiplex kit (Applied Biosystems) (D2S1338, D3S1358, D5S818, D8S1179, D16S539, D18S51, D19S433, D21S11, FGA, TH01, TPOX and VWA) were analysed in six samples of unrelated individuals Macedonians and Albanians from Skopje (Republic of Macedonia), Serbs (from the region of Niš, Kruševak, Kraljevo, Čačak and Kragujevac, Serbia, and Serbs residing in Germany), Greeks from Thrace, Aromuns from Stip (Republic of Macedonia, Gramostians) and Aromuns from Dukasi (Albania, Musequars). A TH01*6.3 allele has been found in a Greek individual and a FGA*41.1 allele in a Macedonian individual from Skopje. The sequences of these two alleles are presented.

INTRODUCTION

There are numerous data on STR allele frequencies in different population worldwide (cf. Huckenbeck and Scheil 1998–2004); however, data from the Balkans are relatively scanty. This study reports on 12 STRs (D2S1338, D3S1358, D5S818, D8S1179, D16S539, D18S51, D19S433, D21S11, FGA, TH01, TPOX, VWA) from six populations, including two Aromun samples. At present, the Aromuns are geographically distributed over Albania, Greece, Bulgaria, Romania and Macedonia. They speak a dialect derived from classical Latin. Their origin is still unclear and they are considered as relict groups of a formerly widespread and continuous large population.

MATERIAL AND METHODS

The 12 DNA-STR-systems have been examined for the following populations (cf. figure 1): 128 Macedonians and 90 Albanians from Skopje (Republic of Macedonia), 102 Serbs (86 from the region of Niš, Kruševak, Kraljevo, Čačak and Kragujevac, Serbia, and 16 Serbs residing in Germany), 106 Greeks from Thrace, 108 Aromuns from Stip (Republic of Macedonia,

Gramostians) and 105 Aromuns from Dukasi (Albania, Musequiars). The participating individuals have belonged to the corresponding ethnic groups over the last three generations.



Figure 1. Geographical location of the populations studied: 1: Macedonians and Albanians from Skopje, Republic of Macedonia, 2: Serbs (region of Niš, Kruševak, Kraljevo, Čačak and Kragujevac, Serbia) 3: Greeks from Thrace, 4: Aromuns from Stip (Republic of Macedonia, Gramostians), 5: Aromuns from Dukasi (Albania, Musequiars).

DNA-extraction: DNA extraction was performed from whole blood with a NucleoSpin®Tissue kit (Macharey-Nagel). For sequencing DNA was extracted from whole blood with a Qiam®DNA Mini kit (Qiagen). **Amplification:** PCR was performed using the genRES®MPX-3 Multiplex kit (Serac) following manufacturer's instructions. The used thermocycler was a Multi Cycler PTC-225 (Biozym).

For the TH01*6.3 allele, PCR was done according to Edwards et al. (1991), Hammond et al. (1994) and Kimpton et al. (1993). The primer was designed according to Kimpton et al. (1993). For the FGA*41.1 allele, PCR was done according to Sprecher et al. (1996) [4], the primer were used as Urquhart et al.

(1995) and Oldroyd et al. (1995) reported. The thermocycler used was a PTC-100 (MJ Research).

Typing: PCR products were separated with the ABI 310 Genetic Analyzer (Applied Biosystems) and referenced ladders. For detection GenScan[®] Analysis Software (Applied Biosystems) was used. For the TH01 allele and the FGA allele the separation was done with a NuSieve[®] Agarose gele. After cutting out the PCR product, they were reamplified and extracted from the gel with a QIAEX II Gel Extraction kit (Qiagen). Sequencing was done according to the method of Sanger et al. (1977).

The statistical data (tables 1–6) have been calculated using the formulas of Butler [2005; expected heterozygosity (H_{exp}), polymorphism information content (PIC)], Krüger et al. [1968; power of exclusion (PE)], and Jones [1972; power of discrimination (PD)]. The genetic distances have been calculated with the PHYLIP program (Felsenstein 1993), based on Reynolds genetic distances (Reynolds et al. 1983), the neighbor-joining tree (Figure 2) has been made with the PHYLIP program, too.

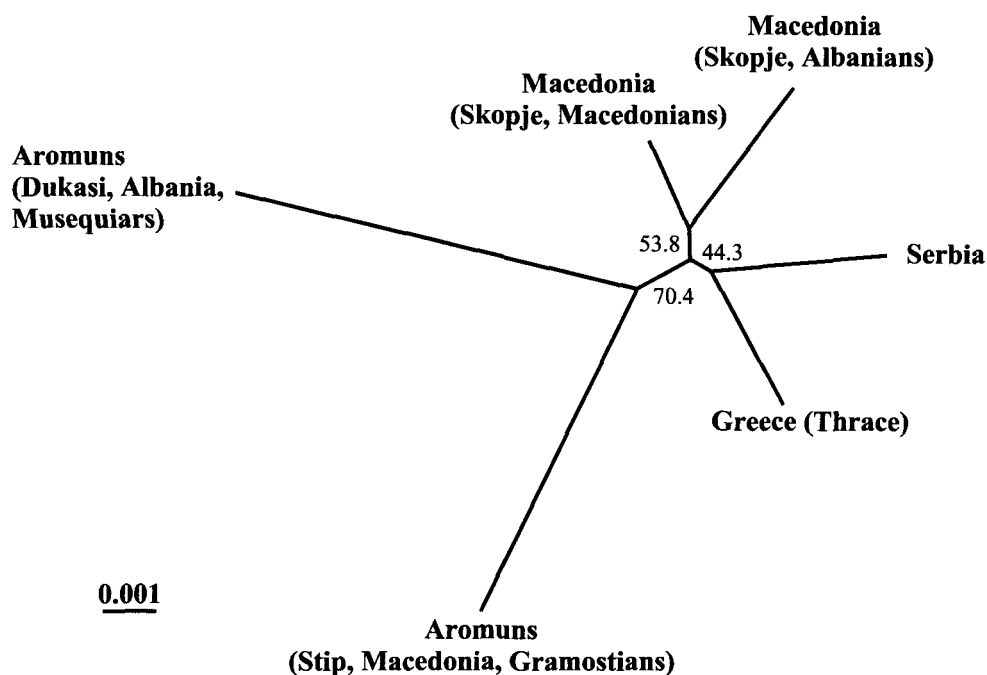


Figure 2. Neighbor-joining tree of the populations studied. The bootstrap supports of the branches are given beside the branches.

Table 1

Allele frequencies for 12 STR loci in Balkan populations: Macedonians from Skopje (Republic of Macedonia)

Allele	D2S1338	D3S1358	D5S818	D8S1179	D16S539	D18S51	D19S433	D21S11	FGA	TH01	TPOX	VWA
n	127	127	128	128	125	127	128	126	128	127	128	127
6	-	-	-	-	-	-	-	-	-	0.2441	-	-
7	-	-	0.0039	-	-	-	-	-	-	0.1457	-	-
8	-	-	-	0.0078	0.0120	-	-	-	-	0.1693	0.5078	-
9	-	-	0.0391	0.0078	0.1120	0.0079	-	-	-	0.1732	0.0742	-
9.3	-	-	-	-	-	-	-	-	-	0.2520	-	-
10	-	-	0.0664	0.0859	0.0640	-	-	-	-	0.0158	0.0781	-
11	-	-	0.3086	0.0430	0.2800	0.0315	0.0039	-	-	-	0.2813	-
12	-	-	0.3828	0.1055	0.3320	0.0984	0.0742	-	-	-	0.0586	-
12.3	-	-	-	-	-	0.0039	-	-	-	-	-	-
13	-	0.0039	0.1836	0.3438	0.1720	0.1693	0.2148	-	-	-	-	0.0039
13.2	-	-	-	-	-	-	0.0117	-	-	-	-	-
14	-	0.0709	0.0156	0.2500	0.0280	0.1102	0.3242	-	-	-	-	0.1299
14.2	-	-	-	-	-	-	0.0469	-	-	-	-	-
15	-	0.2756	-	0.1016	-	0.1535	0.1445	-	-	-	-	0.0945
15.2	-	-	-	-	-	-	0.0703	-	-	-	-	-
16	0.0709	0.3268	-	0.0469	-	0.1614	0.0859	-	-	-	-	0.1772
16.2	-	-	-	-	-	-	0.0195	-	-	-	-	-
17	0.2638	0.1732	-	0.0078	-	0.1102	0.0039	-	0.0039	-	-	0.3228
18	0.1260	0.1457	-	-	-	0.0827	-	-	0.0078	-	-	0.2126
19	0.0827	0.0039	-	-	-	0.0276	-	-	0.0664	-	-	0.0512
20	0.1024	-	-	-	-	0.0039	-	-	0.1406	-	-	0.0039
20.2	-	-	-	-	-	-	-	-	0.0039	-	-	-
21	0.0236	-	-	-	-	0.0197	-	-	0.1758	-	-	0.0039
22	0.0079	-	-	-	-	0.0157	-	-	0.2109	-	-	-

(cont. table 1)

22.2	-	-	-	-	-	-	-	-	0.0039	-	-	-
23	0.1299	-	-	-	-	0.0039	-	-	0.1367	-	-	-
23.2	-	-	-	-	-	-	-	-	0.0039	-	-	-
24	0.0748	-	-	-	-	-	-	-	0.0977	-	-	-
24.2	-	-	-	-	-	-	-	-	0.0039	-	-	-
25	0.0984	-	-	-	-	-	-	-	0.1055	-	-	-
26	0.0157	-	-	-	-	-	-	0.0040	0.0313	-	-	-
26.2	-	-	-	-	-	-	-	-	0.0039	-	-	-
27	0.0039	-	-	-	-	-	-	0.0159	-	-	-	-
28	-	-	-	-	-	-	-	0.1429	-	-	-	-
29	-	-	-	-	-	-	-	0.2938	-	-	-	-
29.2	-	-	-	-	-	-	-	0.0040	-	-	-	-
30	-	-	-	-	-	-	-	0.1825	-	-	-	-
30.2	-	-	-	-	-	-	-	0.0317	-	-	-	-
31	-	-	-	-	-	-	-	0.0397	-	-	-	-
31.2	-	-	-	-	-	-	-	0.0913	-	-	-	-
32.2	-	-	-	-	-	-	-	0.1389	-	-	-	-
33.2	-	-	-	-	-	-	-	0.0675	-	-	-	-
34.2	-	-	-	-	-	-	-	0.0040	-	-	-	-
35.1	-	-	-	-	-	-	-	0.0040	-	-	-	-
41.1	-	-	-	-	-	-	-	-	0.0039	-	-	-
H _{exp}	0.8591	0.7610	0.7183	0.7862	0.7642	0.8784	0.8073	0.8362	0.8599	0.7968	0.6480	0.7907
H _{obs}	0.8740	0.7244	0.7109	0.7578	0.7600	0.9370	0.8281	0.7937	0.8346	0.8425	0.6563	0.8110
PE	0.7228	0.5389	0.4775	0.5975	0.5497	0.7540	0.6318	0.6784	0.7184	0.5942	0.4044	0.5944
PD	0.9660	0.9043	0.8730	0.9268	0.9082	0.9729	0.9395	0.9540	0.9647	0.9272	0.8250	0.9267
PIC	0.8450	0.7224	0.6707	0.7587	0.7280	0.8661	0.7839	0.8170	0.8442	0.7652	0.5969	0.76121
p	0.8134	0.5193	0.8947	0.4033	0.4448	0.8602	0.3732	0.1515	0.2321	0.5833	0.9628	0.7708

H_{exp} (expected heterozygosity), H_{obs} (observed heterozygosity), PE (power of exclusion), PD (probability of discrimination), PIC (polymorphism information content), p (Hardy-Weinberg equilibrium, χ^2 test)

Table 2

Allele frequencies for 12 STR loci in Balkan populations: Albanians from Skopje (Republic of Macedonia)

Allele	D2S1338	D3S1358	D5S818	D8S1179	D16S539	D18S51	D19S433	D21S11	FGA	TH01	TPOX	VWA
n	89	90	90	90	90	90	90	90	89	90	89	90
6	-	-	-	-	-	-	-	-	-	0.2722	-	-
7	-	-	-	-	-	-	-	-	-	0.1944	-	-
8	-	-	-	0.0111	0.0167	-	-	-	-	0.1167	0.4888	-
9	-	-	0.0333	0.0111	0.0611	0.0056	-	-	-	0.1389	0.1404	-
9.3	-	-	-	-	-	-	-	-	-	0.2500	-	-
10	-	-	0.0778	0.0833	0.0500	0.0056	-	-	-	0.0278	0.0730	-
11	-	-	0.3111	0.0667	0.2889	0.0167	-	-	-	-	0.2865	-
12	-	-	0.3778	0.1167	0.3611	0.0889	0.1222	-	-	-	0.0112	-
13	-	-	0.1611	0.3278	0.2000	0.1611	0.2056	-	-	-	-	0.0056
13.2	-	-	-	-	-	-	0.0167	-	-	-	-	-
14	-	0.0500	0.0278	0.2167	0.0222	0.2056	0.3111	-	-	-	-	0.0889
14.2	-	-	-	-	-	-	0.0667	-	-	-	-	-
15	0.0056	0.2333	0.0111	0.1444	-	0.1278	0.1167	-	-	-	-	0.0778
15.2	-	-	-	-	-	-	0.0389	-	-	-	-	-
16	0.1124	0.2556	-	0.0167	-	0.1500	0.1000	-	-	-	-	0.2167
16.2	-	-	-	-	-	-	0.0167	-	-	-	-	-
17	0.2753	0.2333	-	0.0056	-	0.0944	-	-	-	-	-	0.3222
18	0.0562	0.2056	-	-	-	0.0500	-	-	0.0112	-	-	0.1833
18.2	-	-	-	-	-	-	0.0056	-	-	-	-	-
19	0.1011	0.0222	-	-	-	0.0278	-	-	0.0674	-	-	0.0889
19.2	-	-	-	-	-	-	-	-	0.0056	-	-	-
20	0.1124	-	-	-	-	0.0222	-	-	0.1573	-	-	0.0167

(cont. table 2)

21	0.0112	-	-	-	-	0.0222	-	-	0.1292	-	-	-
21.2	-	-	-	-	-	-	-	-	0.0056	-	-	-
22	0.0169	-	-	-	-	0.0222	-	-	0.2022	-	-	-
22.2	-	-	-	-	-	-	-	-	0.0169	-	-	-
23	0.1348	-	-	-	-	-	-	-	0.1236	-	-	-
24	0.0955	-	-	-	-	-	-	-	0.1573	-	-	-
25	0.0787	-	-	-	-	-	-	-	0.1011	-	-	-
26	-	-	-	-	-	-	-	0.0056	0.0112	-	-	-
27	-	-	-	-	-	-	-	0.0167	0.0056	-	-	-
28	-	-	-	-	-	-	-	0.1667	0.0056	-	-	-
29	-	-	-	-	-	-	-	0.3722	-	-	-	-
29.2	-	-	-	-	-	-	-	0.0111	-	-	-	-
30	-	-	-	-	-	-	-	0.1444	-	-	-	-
30.2	-	-	-	-	-	-	-	0.0167	-	-	-	-
31	-	-	-	-	-	-	-	0.0278	-	-	-	-
31.2	-	-	-	-	-	-	-	0.1111	-	-	-	-
32	-	-	-	-	-	-	-	0.0111	-	-	-	-
32.2	-	-	-	-	-	-	-	0.0667	-	-	-	-
33.2	-	-	-	-	-	-	-	0.0444	-	-	-	-
34.2	-	-	-	-	-	-	-	0.0056	-	-	-	-
H _{exp}	0.8516	0.7805	0.7265	0.7992	0.7391	0.8710	0.8158	0.7924	0.8622	0.7919	0.6538	0.7935
H _{obs}	0.8090	0.8111	0.6556	0.8333	0.7778	0.8556	0.7444	0.7444	0.8202	0.7889	0.6966	0.7889
PI	0.7091	0.5647	0.4936	0.6151	0.5098	0.7417	0.6451	0.6169	0.7218	0.5886	0.3991	0.6014
PID	0.9626	0.9157	0.8808	0.9338	0.8895	0.9701	0.9439	0.9344	0.9656	0.9248	0.8246	0.9290
PIC	0.8363	0.7444	0.6821	0.7733	0.6967	0.8578	0.7936	0.7699	0.8468	0.7600	0.5982	0.7651
p	0.4670	0.0919	0.0924	0.1928	0.6965	0.1468	0.1473	-	0.4418	0.2211	0.3228	0.8532

Table 3

Allele frequencies for 12 STR loci in Balkan populations: Serbs

Allele	D2S1338	D3S1358	D5S818	D8S1179	D16S539	D18S51	D19S433	D21S11	FGA	TH01	TPOX	VWA
n	102	102	101	102	102	102	102	102	101	101	102	102
6	—	—	—	—	—	—	—	—	—	0.2624	0.0049	—
7	—	—	—	—	—	—	—	—	—	0.1139	—	—
8	—	—	—	0.0294	0.0343	—	—	—	—	0.1089	0.5735	—
9	—	—	0.0297	0.0049	0.1225	—	—	—	—	0.2178	0.1127	—
9.3	—	—	—	—	—	—	—	—	—	0.2871	—	—
10	—	—	0.0693	0.0392	0.0539	0.0147	—	—	—	0.0099	0.0539	—
11	—	—	0.2921	0.0539	0.3382	0.0196	0.0098	—	—	—	0.2402	—
12	—	—	0.3366	0.1373	0.2647	0.0882	0.0588	—	—	—	0.0147	—
13	—	0.0049	0.2525	0.2990	0.1716	0.1029	0.2157	—	—	—	—	—
13.2	—	—	—	—	—	—	0.0245	—	—	—	—	—
13.3	—	—	—	—	0.0049	—	—	—	—	—	—	—
14	—	0.0784	0.0198	0.3186	0.0098	0.2059	0.3480	—	—	—	—	0.1226
14.2	—	—	—	—	—	—	0.0196	—	—	—	—	—
15	—	0.2892	—	0.0980	—	0.1078	0.1716	—	—	—	—	0.1177
15.2	—	—	—	—	—	—	0.0490	—	—	—	—	—
16	0.0490	0.2598	—	0.0196	—	0.1765	0.0539	—	—	—	—	0.1814
16.2	—	—	—	—	—	—	0.0392	—	—	—	—	—
17	0.2549	0.1961	—	—	—	0.0686	—	—	0.0050	—	—	0.2941
17.2	—	—	—	—	—	—	0.0049	—	—	—	—	—
18	0.0686	0.1569	—	—	—	0.1029	—	—	0.0149	—	—	0.2010
18.2	—	—	—	—	—	—	0.0049	—	—	—	—	—
19	0.0931	0.0147	—	—	—	0.0735	—	—	0.1089	—	—	0.0735
20	0.1078	—	—	—	—	0.0245	—	—	0.1188	—	—	0.0098

(cont. table 3)

21	0.0392	-	-	-	-	0.0098	-	-	0.1782	-	-	-
21.2	-	-	-	-	-	-	-	-	0.0099	-	-	-
22	0.0294	-	-	-	-	-	-	-	0.1980	-	-	-
22.2	-	-	-	-	-	-	-	-	0.0149	-	-	-
23	0.1422	-	-	-	-	0.0049	-	-	0.1188	-	-	-
23.2	-	-	-	-	-	-	-	-	0.0050	-	-	-
24	0.0980	-	-	-	-	-	-	-	0.1238	-	-	-
25	0.1078	-	-	-	-	-	-	-	0.0644	-	-	-
26	0.0049	-	-	-	-	-	-	0.0098	0.0198	-	-	-
27	0.0049	-	-	-	-	-	-	0.0490	0.0198	-	-	-
28	-	-	-	-	-	-	-	0.0980	-	-	-	-
29	-	-	-	-	-	-	-	0.2647	-	-	-	-
30	-	-	-	-	-	-	-	0.1814	-	-	-	-
30.2	-	-	-	-	-	-	-	0.0784	-	-	-	-
31	-	-	-	-	-	-	-	0.0980	-	-	-	-
31.2	-	-	-	-	-	-	-	0.0882	-	-	-	-
32.2	-	-	-	-	-	-	-	0.0980	-	-	-	-
33.2	-	-	-	-	-	-	-	0.0245	-	-	-	-
34.2	-	-	-	-	-	-	-	0.0098	-	-	-	-
H_{exp}	0.8637	0.7794	0.7315	0.7749	0.7669	0.8744	0.7915	0.8511	0.8681	0.7764	0.5976	0.8058
H_{obs}	0.8922	0.6471	0.6667	0.8235	0.7843	0.9216	0.7647	0.8824	0.8713	0.7525	0.4902	0.8039
PE	0.7309	0.5672	0.4885	0.5740	0.5548	0.7481	0.6082	0.7072	0.7349	0.5613	0.3563	0.6180
PD	0.9680	0.9164	0.8801	0.0826	0.9104	0.9717	0.9308	0.9620	0.9685	0.9141	0.7878	0.9352
PIC	0.8503	0.7444	0.6837	0.7430	0.7317	0.8619	0.7657	0.8353	0.8540	0.7404	0.5473	0.7788
p	0.7114	0.1242	0.1352	0.1151	0.3168	0.8522	0.3871	0.9429	0.2790	0.5411	0.0541	0.8275

Table 4

Allele frequencies for 12 STR loci in Balkan populations: Greeks from Thrace (Greece). *: Renewed data

Allele	D2S1338	D3S1358	D5S818	D8S1179	D16S539	D18S51	D19S433	D21S11*	FGA*	TH01*	TPOX	VWA*
n	105	106	106	105	106	106	106	103	105	106	106	106
6	-	-	-	-	-	-	-	-	-	0.2406	0.0047	-
6.3	-	-	-	-	-	-	-	-	-	0.0047	-	-
7	-	-	0.0047	-	-	-	-	-	-	0.1368	-	-
8	-	-	-	0.0333	0.0142	-	-	-	-	0.1179	0.5283	-
9	-	-	0.0566	0.0190	0.1085	-	-	-	-	0.2264	0.1085	-
9.3	-	-	-	-	-	-	-	-	-	0.2689	-	-
10	-	-	0.0943	0.0714	0.1038	0.0142	-	-	-	0.0047	0.0472	-
11	-	-	0.2925	0.0524	0.3066	0.0283	0.0047	-	-	-	0.2830	-
12	-	-	0.3726	0.1000	0.2453	0.1368	0.1085	-	-	-	0.0283	-
13	-	0.0047	0.1557	0.2762	0.2028	0.1226	0.2689	-	-	-	-	0.0094
13.2	-	-	-	-	-	-	0.0283	-	-	-	-	-
14	-	0.1321	0.0142	0.2667	0.0189	0.1698	0.3113	-	-	-	-	0.0660
14.2	-	-	-	-	-	-	0.0566	-	-	-	-	-
15	-	0.1981	0.0094	0.1190	-	0.1368	0.0991	-	-	-	-	0.0802
15.2	-	-	-	-	-	-	0.0566	-	-	-	-	-
16	0.0667	0.1981	-	0.0524	-	0.1274	0.0189	-	0.0048	-	-	0.1934
16.2	-	-	-	-	-	-	0.0330	-	-	-	-	-
17	0.2571	0.2547	-	0.0048	-	0.0991	0.0047	-	-	-	-	0.3207
17.2	-	-	-	-	-	-	0.0094	-	-	-	-	-
18	0.0714	0.2075	-	0.0048	-	0.0849	-	-	0.0190	-	-	0.2076
19	0.1143	-	-	-	-	0.0377	-	-	0.0857	-	-	0.0896
20	0.1762	0.0047	-	-	-	0.0236	-	-	0.1143	-	-	0.0283

(cont. table 4)

21	0.0190	-	-	-	-	0.0047	-	-	0.1619	-	-	0.0047
22	0.0476	-	-	-	-	0.0047	-	-	0.1667	-	-	-
22.2	-	-	-	-	-	-	-	-	0.0048	-	-	-
23	0.1048	-	-	-	-	0.0094	-	-	0.1905	-	-	-
23.2	-	-	-	-	-	-	-	-	0.0048	-	-	-
24	0.0619	-	-	-	-	-	-	-	0.1190	-	-	-
25	0.0667	-	-	-	-	-	-	-	0.0857	-	-	-
26	0.0048	-	-	-	-	-	-	0.0194	0.0381	-	-	-
27	0.0095	-	-	-	-	-	-	0.0340	-	-	-	-
28	-	-	-	-	-	-	-	0.0922	0.0048	-	-	-
29	-	-	-	-	-	-	-	0.3107	-	-	-	-
29.2	-	-	-	-	-	-	-	0.0146	-	-	-	-
30	-	-	-	-	-	-	-	0.1845	-	-	-	-
30.2	-	-	-	-	-	-	-	0.0243	-	-	-	-
31	-	-	-	-	-	-	-	0.0437	-	-	-	-
31.2	-	-	-	-	-	-	-	0.0825	-	-	-	-
32	-	-	-	-	-	-	-	0.0049	-	-	-	-
32.2	-	-	-	-	-	-	-	0.1505	-	-	-	-
33.2	-	-	-	-	-	-	-	0.0291	-	-	-	-
34.2	-	-	-	-	-	-	-	0.0097	-	-	-	-
H _{exp}	0.8582	0.7961	0.7390	0.8163	0.7816	0.8823	0.8004	0.8263	0.8659	0.7859	0.6260	0.7969
H _{obs}	0.8857	0.8113	0.7925	0.7619	0.7830	0.8962	0.7547	0.8252	0.8762	0.7736	0.6226	0.8019
PE	0.7214	0.5913	0.5133	0.6460	0.5747	0.7615	0.6214	0.6676	0.7293	0.5757	0.3761	0.6086
PD	0.9655	0.9263	0.8910	0.9437	0.9190	0.9745	0.9352	0.9507	0.9673	0.9201	0.8047	0.9315
PIC	0.8439	0.7640	0.6981	0.7938	0.7483	0.8707	0.7754	0.8072	0.8512	0.7518	0.5706	0.7696
p	0.8194	0.0901	0.1171	0.4265	0.7110	0.6040	0.3165	0.6903	0.8252	0.2327	0.2428	0.7590

Table 5

Allele frequencies for 12 STR loci in Balkan populations: Aromuns from Stip (Republic of Macedonia, Gramostians). *: Renewed data

Allele	D2S1338	D3S1358	D5S818	D8S1179	D16S539	D18S51	D19S433	D21S11*	FGA*	TH01*	TPOX	VWA*
n	108	108	108	108	108	108	108	108	108	107	108	108
6	-	-	-	-	-	-	-	-	-	0.2804	-	-
7	-	-	-	-	-	-	-	-	-	0.1121	-	-
8	-	-	-	0.0046	0.0046	-	-	-	-	0.1916	0.5463	-
9	-	-	0.0648	0.0046	0.0602	-	-	-	-	0.1776	0.1065	-
9.3	-	-	-	-	-	-	-	-	-	0.2290	-	-
10	-	-	0.0648	0.1435	0.0602	-	-	-	-	0.0094	0.0694	-
11	-	-	0.2639	0.0602	0.3565	0.0093	-	-	-	-	0.2037	-
12	-	-	0.4120	0.0880	0.3843	0.1389	0.1111	-	-	-	0.0741	-
12.3	-	-	-	-	-	0.0046	-	-	-	-	-	-
13	-	-	0.1944	0.3472	0.0972	0.1250	0.2176	-	-	-	-	-
13.2	-	-	-	-	-	-	0.0278	-	-	-	-	-
14	-	0.0926	-	0.2315	0.0370	0.1620	0.3565	-	-	-	-	0.0926
14.2	-	-	-	-	-	-	0.0278	-	-	-	-	-
15	-	0.3565	-	0.1111	-	0.0324	0.1157	-	-	-	-	0.1019
15.2	-	-	-	-	-	-	0.0231	-	-	-	-	-
16	0.0556	0.2269	-	0.0046	-	0.2315	0.0278	-	-	-	-	0.1806
16.2	-	-	-	-	-	-	0.0926	-	-	-	-	-
17	0.2315	0.1991	-	0.0046	-	0.1898	-	-	-	-	-	0.3611
18	0.0509	0.1250	-	-	-	0.0509	-	-	-	-	-	0.1991
19	0.1250	-	-	-	-	0.0370	-	-	0.0417	-	-	0.0602

(cont. table 5)												
20	0.0972	-	-	-	-	0.0093	-	-	0.0694	-	-	0.0046
21	0.1250	-	-	-	-	-	-	-	0.2037	-	-	-
22	0.0046	-	-	-	-	0.0093	-	-	0.1435	-	-	-
23	0.0741	-	-	-	-	-	-	-	0.2315	-	-	-
23.2	-	-	-	-	-	-	-	-	0.0046	-	-	-
24	0.2083	-	-	-	-	-	-	-	0.1343	-	-	-
25	0.0139	-	-	-	-	-	-	-	0.1019	-	-	-
26	-	-	-	-	-	-	-	-	0.0509	-	-	-
27	-	-	-	-	-	-	-	0.0417	0.0185	-	-	-
28	0.0139	-	-	-	-	-	-	0.0926	-	-	-	-
29	-	-	-	-	-	-	-	0.2870	-	-	-	-
30	-	-	-	-	-	-	-	0.2222	-	-	-	-
30.2	-	-	-	-	-	-	-	0.0417	-	-	-	-
31	-	-	-	-	-	-	-	0.0417	-	-	-	-
31.2	-	-	-	-	-	-	-	0.0972	-	-	-	-
32.2	-	-	-	-	-	-	-	0.1019	-	-	-	-
33.2	-	-	-	-	-	-	-	0.0741	-	-	-	-
H _{exp}	0.8507	0.7576	0.7144	0.7815	0.7071	0.8439	0.7884	0.8291	0.8464	0.7880	0.6384	0.7747
H _{obs}	0.8056	0.7037	0.6852	0.7963	0.6944	0.8426	0.8426	0.8056	0.8056	0.8037	0.5926	0.8056
PI	0.7034	0.5358	0.4742	0.5845	0.4708	0.6884	0.6031	0.6690	0.6938	0.5794	0.4118	0.5733
PD	0.9608	0.9032	0.8720	0.9225	0.8665	0.9568	0.9293	0.9511	0.9583	0.9216	0.8295	0.9184
PIC	0.8338	0.7195	0.6680	0.7518	0.6594	0.8251	0.7624	0.8095	0.8283	0.7545	0.5986	0.7438
p	0.9138	0.2722	0.8100	0.5626	0.3474	0.5860	0.7838	0.9939	0.9226	0.6832	0.4033	0.9799

Table 6

Allele frequencies for 12 STR loci in Balkan populations: Aromuns from Dukasi (Albania, Musequians)

Allele	D2S1338	D3S1358	D5S818	D8S1179	D16S539	D18S51	D19S433	D21S11	FGA	TH01	TPOX	VWA
n	105	104	105	104	105	104	105	105	105	105	105	103
5	-	-	-	-	-	-	-	-	-	0.0095	-	-
6	-	-	-	-	-	-	-	-	-	0.3048	-	-
7	-	-	0.0048	-	-	-	-	-	-	0.1143	0.0095	-
8	-	-	-	0.0673	0.0619	-	-	-	-	0.1238	0.4905	-
9	-	-	0.0095	0.0048	0.1000	-	-	-	-	0.3143	0.1333	-
9.3	-	-	-	-	-	-	-	-	-	0.1095	-	-
10	-	-	0.0571	0.0529	0.0190	0.0048	-	-	-	0.0238	0.0524	-
11	-	-	0.2857	0.0673	0.4381	0.0192	-	-	-	-	0.2476	-
12	-	-	0.3857	0.2115	0.2571	0.1731	0.1190	-	-	-	0.0667	-
13	-	-	0.2333	0.3558	0.1190	0.1587	0.2762	-	-	-	-	-
13.2	-	-	-	-	-	-	0.0190	-	-	-	-	-
14	-	0.0962	0.0238	0.1587	0.0048	0.1202	0.2714	-	-	-	-	0.0922
14.2	-	-	-	-	-	-	0.0190	-	-	-	-	-
15	-	0.2356	-	0.0817	-	0.1587	0.1095	-	-	-	-	0.1116
15.2	-	-	-	-	-	-	0.0619	-	-	-	-	-
16	0.0810	0.3269	-	-	-	0.1106	0.0714	-	-	-	-	0.2233
16.2	-	-	-	-	-	-	0.0476	-	-	-	-	-
17	0.1381	0.1683	-	-	-	0.1442	0.0048	-	0.0048	-	-	0.3010
18	0.0619	0.1683	-	-	-	0.0577	-	-	-	-	-	0.1214
19	0.1524	0.0048	-	-	-	0.0288	-	-	0.0476	-	-	0.1116

(cont. table 6)												
20	0.1810	-	-	-	-	0.0048	-	-	0.0667	-	-	0.0388
21	0.0762	-	-	-	-	0.0192	-	-	0.2095	-	-	-
22	-	-	-	-	-	-	-	-	0.1762	-	-	-
23	0.1524	-	-	-	-	-	-	-	0.1571	-	-	-
23.2	-	-	-	-	-	-	-	-	0.0048	-	-	-
24	0.0857	-	-	-	-	-	-	-	0.1619	-	-	-
24.3	-	-	-	-	-	-	-	-	0.0048	-	-	-
25	0.0667	-	-	-	-	-	-	-	0.1095	-	-	-
26	0.0048	-	-	-	-	-	-	-	0.0429	-	-	-
26.2	-	-	-	-	-	-	-	-	0.0048	-	-	-
27	-	-	-	-	-	-	-	0.0143	0.0095	-	-	-
28	0.0139	-	-	-	-	-	-	0.1762	-	-	-	-
29	-	-	-	-	-	-	-	0.3190	-	-	-	-
30	-	-	-	-	-	-	-	0.1762	-	-	-	-
30.2	-	-	-	-	-	-	-	0.0238	-	-	-	-
31	-	-	-	-	-	-	-	0.0381	-	-	-	-
31.2	-	-	-	-	-	-	-	0.1095	-	-	-	-
32.2	-	-	-	-	-	-	-	0.0905	-	-	-	-
33.2	-	-	-	-	-	-	-	0.0524	-	-	-	-
H _{exp}	0.8737	0.7717	0.7112	0.7849	0.7136	0.8672	0.8120	0.8110	0.8534	0.7673	0.6731	0.8099
H _{obs}	0.9048	0.8077	0.7524	0.7885	0.7238	0.8750	0.8286	0.8000	0.8762	0.8286	0.7143	0.8252
PE	0.7443	0.5559	0.4604	0.5946	0.4875	0.7311	0.6369	0.6361	0.7058	0.5556	0.4376	0.6295
PD	0.9708	0.9120	0.8650	0.9262	0.8775	0.9677	0.9409	0.941	0.9614	0.9106	0.8482	0.9390
PIC	0.8604	0.7358	0.6596	0.7574	0.6731	0.8526	0.7882	0.7878	0.8363	0.7321	0.6281	0.7850
p	0.6027	0.6165	0.0712	0.4767	0.6887	0.8371	0.0953	0.2111	0.2673	0.4789	0.7648	0.9767

RESULTS AND DISCUSSION

The allele frequencies are shown in tables 1-6. There were no deviations from the Hardy-Weinberg equilibrium (χ^2 -test, $p > 0.05$), except D21S11 in the Albanian sample from Macedonia. However, after using the Bonferroni correction (Sachs 2005), this result is not significant. The allele frequencies of the populations studied are close together. There are no substantial differences to those of other European populations. Two rare alleles have been found in one individual from Greece, Thrace (TH01*6.3) and in one individual from Macedonia (FGA*41.1). The structures of TH01*6.3 and FGA*41.1 are shown in table 7. The structure of the TH01*6.3 allele corresponds to that reported by Klintschar et al. (1998). The sequence of the first 22 tetranucleotides of FGA*41.1 is similar to that of FGA*22 (Butler 2005).

Table 7

Structure of TH01*6.3 and FGA*41.1. The grey marked part of the FGA*41.1 structure corresponds to the structure of FGA*22 (Butler 2005).

TH01*6.3	5'-[AATG] ₃ ATG [AATG] ₃ -3'
FGA*41.1	5'-[TTTC] ₃ TTTC TTCT [CTTT] ₄ CTCC [TTCC] ₂ TTTC TTCC [TTTC] ₁₀ [TCCT] ₃ TTCT TCCT TTCT TTTT T-3'

The genetic distances between the populations studied are rather small, the Aromun populations showing slightly larger distances (table 8). Figure 2 shows a neighbor-joining tree of the populations studied. Due to the small genetic distances, the populations in figure 2 are relatively close to each other. The two Aromun populations are more separated including a higher bootstrap support of the branches. These results confirm earlier results from the studies of classical markers (Scheil et al. 2004, Schmidt and Scheil 2003, Schmidt et al. 2000, 2003) and of the mitochondrial DNA (Bosch et al. 2006). The larger and more intermingled populations show lesser differences than the smaller and more or less isolated populations (c.f. Baltova et al. 2005, Scheil et al. 2001, 2003, Schmidt and Scheil 2003, Siváková et al. 2007). The latter differ mostly in their genetic structure from larger populations and among one another.

Table 8
Genetic distances (Reynolds distances) between the populations studied

	1	2	3	4	5
1 Macedonians from Skopje (Republic of Macedonia)	***				
2 Albanians from Skopje (Republic of Macedonia)	0 0051	***			
3 Serbs	0 0057	0 0084	***		
4 Greeks from Thrace (Greece)	0 0063	0 0063	0 0062	***	
5 Aromuns from Stip (Republic of Macedonia, Gramostians)	0 0098	0 0121	0 0111	0 0119	***
6 Aromuns from Dukası (Albania, Musequars)	0 0115	0 0127	0 0130	0 0118	0 0145

BIBLIOGRAPHY

- Baltova, S , Scheil, H -G , Schmidt, H D 2005, *Haemogenetic studies in Bulgaria*, *Anthrop Anz* , **63**, p 141–151
- Bosch, E , Calafell, F , Gonzalez-Neira, A , Flaiz, C , Mateu, E , Scheil, H -G , Huckenbeck, W , Efremovska, L , Mikerezi, I , Xirontiris, N , Grasa, C , Schmidt, H , Comas, D 2006, *Paternal and maternal lineages in the Balkans show a homogeneous landscape over linguistic barriers, except for the isolated Aromuns* *Ann Hum Genet* , **70**, p 459–487
- Butler, J M 2005, *Forensic DNA typing Biology, technology, and genetics of STR markers*, Amsterdam, Elsevier Academic Press, 2nd edition, p 489–491
- Edwards, A , Civitello, A , Hammond H A , Caskey, C T 1991, *DNA typing and genetic mapping with trimeric and tetrameric tandem repeats*, *Am J Hum Genet* , **49**, p 746–756
- Felsenstein, J 1993, *PHYLIP (Phylogeny Interference Package)*, version 3 572c Distributed by the author Department of Genetics, University of Washington, Seattle
- Hammond, H A , Jin, L , Zhong, Y , Caskey, C T Chakraborty, R 1994, *Evaluation of 13 short tandem repeat loci for use in personal identification applications*, *Am J Hum Genet* , **55**, p 175–189
- Huckenbeck, W , Scheil, H -G , *The distribution of the human DNA-PCR polymorphisms A worldwide database, Internet supplement 1998-2004*, [http //www uni-duesseldorf de/WWW/MedFak/Serology/dna.html](http://www.uni-duesseldorf.de/WWW/MedFak/Serology/dna.html)

- Huckenbeck, W , Scheil, H -G , Schmidt, H D , Efremovska, L , Mikerezi, I 2004, *Allele frequencies of D21S11, FGA, TH01 and VWA in populations of the Balkans*, Hum Biol , **76**, p 943–946
- Huckenbeck, W , Scheil, H -G , Schmidt, H D , Efremovska, L , Xirotiris, N 2001, *Population genetic studies in the Balkans II DNA-STR systems*, Anthropol Anz , **59**, p 213–225
- Jones, D A , 1972, *Blood samples Probability of discrimination* J Forensic Sci Soc , **12**, p 355–359
- Kimpton, C P , Gill, P , Walton, A , Urquhart, A , Millican, E S , Adams, M 1993, *Automated DNA profiling employing multiplex amplification of short tandem repeat loci*, PCR Meth Appl , **3**, p 13 – 22
- Klitschkar, M , Kozma, Z , Al Hammadi, N , Abdull Fatah, M , Nohammer, C 1998, *A study on the short tandem repeat systems HumCD4, HumTH01 and HumFIBRA in population samples from Yemen and Egypt* Int J Legal Med , **111**, p 107–109
- Kruger, J , Fuhrmann, E , Lichte, K -H , Steffens, C 1968, *Zur Verwendung des Polymorphismus der sauren Erythrozytenphosphatase bei der Vaterschaftsbegutachtung*, Dtsch Z gerichtl Med , **64**, p 127–146
- Oldroyd, N J , Urquhart, A J , Kimpton, C P , Millican, E S , Watson, S K , Downes, T , Gill, P D 1995, *A highly discriminating octoplex short tandem repeat polymerase chain reaction system suitable for human individual identification*, Electrophoresis, **16**, p 334–337
- Reynolds, J , Weir, B S , Cockerham, C C , 1983, *Estimation of the coancestry coefficient Basis for a short-term genetic distance*, Genetics, **105**, p 767–779
- Sachs, L 2004, *Angewandte Statistik*, Berlin, Springer Verl , 11th edition, p 183–184
- Sanger, F , Nicklen, S , Coulson, R , 1977, *DNA sequencing with chain-terminating inhibitors*, Proc Natl Acad Sci USA, **74**, p 5463–5467
- Scheil, H -G , Scheffrahn, W , Schmidt, H D , Huckenbeck, W , Efremovska, L , Xirotiris, N 2001, *Population genetic studies in the Balkans I Serum proteins*, Anthropol Anz , **59**, p 203–211
- Scheil, H -G , Schmidt, H D , Efremovska, L , Mikerezi, I , Huckenbeck, W 2004, *Phenotype and allele frequencies of some serum protein polymorphisms in populations of the Balkans*, Anthropol Anz , **62**, p 429–434
- Scheil, H -G , Schmidt, H D , Huckenbeck, W , Kraemer, K 2003, *Rugen (Deutschland) Hamogenetische Untersuchung einer Inselpopulation*, Anthropol Anz , **61**, p 369–380
- Schmidt, H D , Scheil, H -G 2003, *Blood group frequencies in Romania Microregional and ethnic differences*, Anthropol Anz , **61**, p 381–393
- Schmidt, H , Scheil, H -G , Huckenbeck, W , Scheffrahn, W , Efremovska, L 2003, *Genetic studies in South Balkan populations* Coll Antrop , **27**, p 501 – 506
- Schmidt, H D , Scheil, H -G , Scheffrahn, W 2000, *The history and genetics of the Aromun populations*, in Susanne, C , Bodzsar, E (eds), 2000, *Human population genetics in Europe Biennial Books of EAA*, Vol 1, Budapest, Eotvos University Press, p 29–37
- Sivakova, D , Scheil, H -G , Schmidt, H D , Vulpe, C 2007, *Population affinities assessed by dermatoglyphic and hemogenetic variables*, Anthropol Anz , **65**, p 137–146
- Sprecher, C J , Puers, C , Lins, A M , Schumm, J W 1996, *General approach to analysis of polymorphic short tandem repeat loci*, BioTechniques, **20**, p 266–276
- Urquhart, A , Oldroyd, N J , Kimpton, C P , Gill, P 1995, *Highly discriminating heptaplex short tandem repeat PCR system for forensic identification*, Biotechniques, **18**, p 166–121

*Institute of Human Genetics and Anthropology,
Heinrich-Heine-University Dusseldorf, Germany
horst.schmidt@alumni.uni-ulm.de*

ASPECTS CONCERNANT LE DÉVELOPPEMENT MÉTRIQUE CÉPHALO-FACIAL DES ENFANTS ÉCOLIERS AVEC DÉFICIENCES DE LA VUE*

ELEONORA LUCA, CORNELIU VULPE, LĂCRĂMIOARA PETRE, MONICA PETRESCU,
MARIUS RADU, FELICIA LUCACI, VALERIA CHILIMENT

Aspects regarding cephalic-facial metric development of the school-aged children with visual deficiencies. In the present paper, we estimate cephalic-facial dimensional development of the children with visual deficiencies from a special school from Bucharest (I-IX classes) 142 subjects (92 boys and 50 girls) between the age of 7 and 17 years-old constitute the group. Because the age and sex-related samples are not statistically representative, it has been used the variable "z", comparing the children with visual deficiencies with the normal children, related to characteristics, age and sex. Compared to the normal children, the subjects of both sexes have a representatively shorter height of the head, face and nose. The phenotypes are placed mainly inside the interval " $M \pm \sigma$ ", but the variations curves are oriented to the small and very small categories, excepting the width of the mandible for both sexes and the width of the forehead for girls. Compared to the deaf-and-dumb children deaf mute children, the children with visual deficiencies have a longer, lower and narrower cephalic calotte, a larger forehead, mandible, and a shorter and broader nose.

Pendant les années 2006–2007 le collectif d'Anthropologie de la famille sous la coordination de dr. Corneliu Vulpe a commencé une étude d'anthropologie médicale concernant les enfants avec déficiences de la vue d'une école spéciale de Bucarest (les classes I–IX)*. Il ont été suivis des aspects concernant le développement physique, la morphophysionomie de l'œil et de l'orbite et des autres aspects médicaux (inclusivement génétiques) et psycho-sociaux (Luca et colab., 2004:13–17).

* Nous remercions le personnel didactique et médical de l'école de Bucarest pour les déficients de la vue pour leur aide précieuse.

MATÉRIEL ET MÉTHODE

Le lot des écoliers de classes I–IX est composé par 142 sujets de 7–17 ans, dont 92 garçons (7–17 ans) et 50 filles (7–16 ans).

Les données fondamentales sont les valeurs absolues (dimensions) individuelles des neuf caractères dimensionnels céphalo-faciaux.

Parce que les échantillons selon l'âge et le sexe ne sont pas statistiquement représentatifs, comme aussi dans le cas des enfants sourds-muets, nous avons utilisé la méthode de la comparaison avec une population-étalon de même âge et sexe. Pour apprécier la position de chaque sujet par rapport à la population-étalon (la valeur moyenne du caractère chez les enfants normaux selon l'âge et le sexe) nous avons calculé la variable normée (réduite) «*z*»: $z = (X - M)/\sigma$, où *z* = la variable normée; *X* = la valeur individuelle (phénotype du caractère); *M* = la valeur moyenne-étalon; σ = l'écart-type de la moyenne-étalon (E.Luca et colab., 2004:13–17; Rapport d'un comité OMS d'experts, 1995:35).

On a calculé les valeurs moyennes de «*z*» et les fréquences relatives des phénotypes dimensionnels céphalo-faciaux selon le caractère et le sexe des sujets avec déficiences de la vue par rapport aux enfants normaux.

Pour apprécier le dimorphisme métrique et les différences par rapport aux enfants sourds-muets on a utilisé le test Student (*t*).

RÉSULTATS ET DISCUSSIONS

I. LE DÉVELOPPEMENT MÉTRIQUE MOYEN CÉPHALO-FACIAL DES ENFANTS AVEC DÉFICIENCES DE LA VUE (Tableau 1)

Les résultats concernant le développement moyen céphalo-facial des enfants avec déficiences de la vue sont prédominant négatifs chez les deux sexes, par rapport aux enfants normaux: les diamètres longitudinaux, transversaux et verticaux céphaliques, la largeur et la hauteur de la face et la hauteur du nez. Chez les garçons, par rapport aux filles, aussi la largeur du nez. Les valeurs moyennes négatives statistiquement significatives sont pour la hauteur céphalique (*t-v*) chez les garçons et pour les hauteurs de la face (*n-gn*) et du nez (*n-sn*) chez les filles. La largeur de la mandibule (*go-go*) est plus grande, mais pas significative statistiquement, chez les deux sexes et chez les filles aussi la largeur du front. Chez les garçons la largeur du front est presque égale avec la valeur moyenne-étalon.

En conséquence, par rapport aux enfants normaux, nous avons constaté chez les enfants avec déficiences de la vue un développement plus faible des hauteurs

céphalo-faciales (t-v, n-gn, n-sn) statistiquement significatives (même les filles ont la hauteur de la tête approchée de limite de la signification).

Tableau 1

Valeurs moyennes de la variable réduite «z» concernant les caractères métriques céphalo-faciaux des enfants avec déficience de la vue

N°	Caractère	Garçons (N = 92)				Filles (N = 50)				t (♀ vs. ♂)
		Min.	Max.	X	$\pm \sigma$	Min.	Max.	X	$\pm \sigma$	
1.	g-op	-3,11	+3,04	-0,12	1,08	-2,36	+2,31	-0,20	1,15	-0,40
2.	eu-eu	-4,68	+1,17	-0,67	1,09	-3,50	+1,48	-0,80	1,22	-0,65
3.	t-v	-4,06	+1,48	– 1,24*	1,12	-4,00	+2,39	-0,99	1,05	+1,47
4.	ft-ft	-3,00	+3,66	+0,03	1,27	-1,63	+3,14	+0,32	1,06	+1,45
5.	zy-zy	-5,64	+2,85	-0,20	1,52	-3,54	+2,62	-0,49	1,27	-1,21
6.	go-go	-2,25	+5,10	+0,46	1,31	-1,95	+3,70	+0,55	1,26	+0,41
7.	n-gn	-3,22	+2,68	-0,76	1,35	-3,70	+1,22	– 1,01*	1,25	-1,14
8.	n-sn	-4,17	+2,66	-0,76	1,45	-5,66	+1,72	– 1,08*	1,44	-1,33
9.	al-al	-5,18	+3,01	-0,13	1,36	-3,69	+3,89	+0,07	1,29	+0,91

* différences statistiquement significatives

II. LA VARIABILITÉ DES CARACTÈRES DIMENSIONNELS CÉPHALO-FACIAUX CHEZ LES ENFANTS AVEC DÉFICIENS DE LA VUE (Tableau 2)

Les phénotypes de la plupart des caractères s'inscrivent prédominant dans l'intervalle « $M \pm \sigma$ » et la courbe de variation se dirige vers les catégories petites (g-op, eu-eu, t-v, zy-zy, n-gn, n-sn). Pour la hauteur céphalique (t-v), la courbe de variation est fortement dirigée vers les catégories petites chez les garçons et chez les filles les phénotypes s'inscrivent prédominant dans l'intervalle « $< M - \sigma$ » (46%). Des courbes presque symétriques réalisent les garçons par la largeur du front (ft-ft), et les filles par la largeur du nez (al-al).

Tableau 2

Variabilité du développement céphalo-facial chez les enfants avec déficience de la vue

Caractère	Sexe	N	< M - 2 σ		< M - σ		M $\pm$ σ		> M + σ		> M + 2 σ	
			n	%	n	%	n	%	n	%	n	%
g-op	garçons	92	4	4,35	12	13,04	64	69,57	9	9,78	3	3,26
	filles	50	5	10,00	8	16,00	30	60,00	6	12,00	1	2,00
eu-eu	garçons	92	10	10,87	25	27,17	50	54,35	7	7,61	–	–
	filles	50	9	18,00	14	28,10	23	46,00	4	8,00	–	–
t-v	garçons	92	21	22,83	32	34,78	37	40,22	2	2,17	–	–
	filles	50	5	10,00	23	46,00	20	40,22	1	2,00	1	2,00
ft-ft	garçons	92	2	2,17	16	17,39	56	60,87	11	11,96	7	7,61
	filles	50	–	–	5	10,10	32	64,00	10	20,00	3	6,00
zy-zy	garçons	92	8	8,70	19	20,65	48	52,17	11	11,96	6	6,52
	filles	50	7	14,00	11	22,00	26	52,00	6	12,00	–	–
go-go	garçons	92	2	2,17	12	13,04	51	55,43	16	17,39	11	11,96
	filles	50	–	–	6	12,00	27	54,00	10	20,00	7	14,00
n-gn	garçons	92	18	19,57	25	27,17	39	42,39	5	5,43	5	5,43
	filles	50	9	18,00	15	30,00	24	48,00	2	4,00	–	–
n-sn	garçons	92	17	18,48	26	28,26	36	39,13	10	10,87	3	3,26
	filles	50	9	18,00	12	24,00	28	56,00	1	2,00	–	–
al-al	garçons	92	7	7,61	13	14,13	60	65,22	6	6,52	6	6,52
	filles	50	2	4,00	3	6,00	38	76,00	3	6,00	4	8,00

Par rapport aux garçons, les filles présentent une courbe de variation plus accentuée vers les catégories petites pour la largeur de la tête, la hauteur faciale et nasale et vers les catégories grandes pour la largeur de la mandibule.

III. ASPECTS COMPARATIFS CONCERNANT LE DÉVELOPPEMENT DIMENSIONNEL CÉPHALO-FACIAL DES ENFANTS AVEC DÉFICIENCES DE LA VUE ET DE L'OUÏE (Figure 1)

En ce qui concerne les valeurs moyennes de la longueur et la largeur de la tête, la largeur du front et de la face, la hauteur de la face et largeur du nez ne sont pas des différences statistiquement significatives entre les garçons avec déficiences de la vue et de l'ouïe. Les garçons avec déficiences de la vue ont, par rapport aux

garçons sourd-muets, statistiquement significative plus petite la hauteur de la calotte céphalique et du nez et plus grande la largeur de la mandibule.

Les filles avec déficiences de la vue ont, par rapport aux filles avec déficiences de l'ouïe, ont statistiquement significative plus grande la largeur du front et de la mandibule et plus petite la largeur de la face et la hauteur du nez. La certitude des différences a été appréciée sur les deux lots de déficients par le test Student (t) en utilisant les mêmes moyennes-étalon des enfants normaux (C.Glavce et colab.,a, 1988:55–66; C.Glavce et colab., b, 1990:11–18; Rapport d'un comité OMS d'experts, 1995:35).

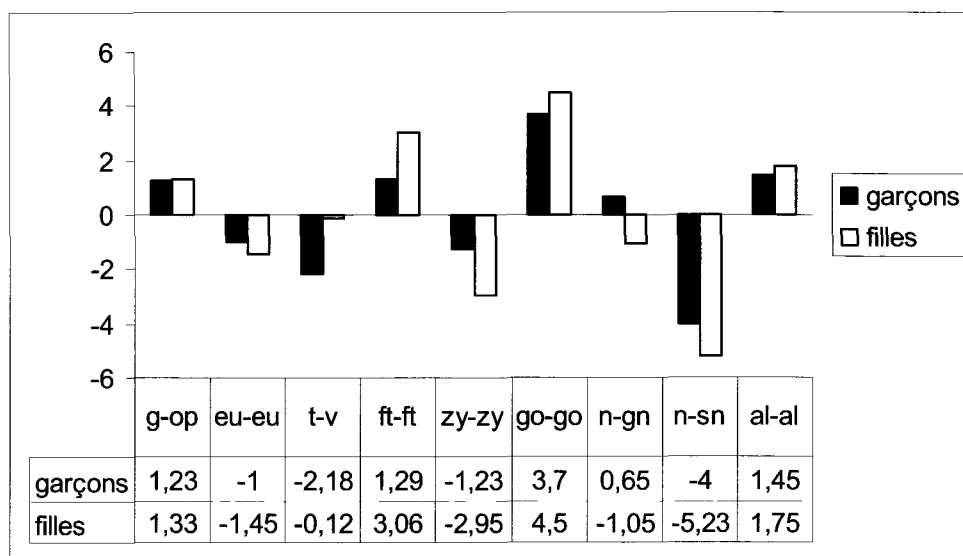


Figure 1 – Valeurs de «t» concernant les dimensions céphalo-faciales chez les enfants déficients de la vue par rapport aux enfants sourds-muets

Les enfants avec déficiences de la vue de deux sexes ont, par rapport les enfants sourd-muets, une calotte céphalique plus longue, plus étroite et la hauteur un peu plus petite, un front plus large, une face plus étroite, une mandibule plus large, un nez plus bas et plus large (E. Luca et colab., 2004:13–17).

CONCLUSIONS

Pour estimer le développement métrique céphalo-facial des enfants avec déficiences de la vue on a utilisé, comme dans le cas des sourds-muets, la variable normée «Z», en comparant les phénotypes dimensionnels des enfants avec

déficiences de la vue avec les valeurs moyennes des enfants normaux selon le caractère, l'âge et le sexe.

1. Par rapport aux enfants normaux, les moyennes négatives statistiquement significatives chez les enfants avec déficiences de la vue sont celles de la hauteur de la calotte céphalique (t-v) chez les garçons (chez les filles est presque à la limite de la signification) et de la hauteur de la face et du nez chez les deux sexes.
2. Les phénotypes de la plupart des caractères se situent prédominant dans la catégorie de variation « $< M \pm \sigma$ ». Les courbes de variation sont dirigées, généralement, vers les catégories petites et très petites, excepté la largeur de la mandibule chez les deux sexes et la largeur du front chez les filles.
3. Les enfants avec déficience de la vue ont, par rapport aux enfants sourds-muets, une calotte céphalique plus longue, plus étroite et la hauteur un peu plus petite, un front et une mandibule plus larges, une face plus étroite et un nez plus bas et plus large.
4. C'est intéressant à remarquer une proportion différente entre les deux sexes chez les deux lots d'enfants étudiés en tenant compte du fait que nous avons cherché presque tous les enfants de deux écoles. Ainsi, chez les enfants sourd-muets prédominent les filles (106:59) tandis que chez les enfants avec déficiences de la vue prédominent les garçons (102:50).

En conclusion, on peut supposer que ces différences métriques céphalo-faciales sont une conséquence, parmi des autres, des deux types de déficiences, respectivement de la vue et de l'ouïe, qui déterminent un développement céphalo-facial un peu différent.

BIBLIOGRAPHIE

- 1 Glavce Cristiana, Gabriela Călin, Alexandrina Ciachiris, 1988, *Modification de la typologie céphalo-faciale pendant la croissance (4-12 ans)*, Ann Roum Anthropol, **25**, 55-66
- 2 Glavce Cristiana, Gabriela Roibu, 1990, *Modificările tipologiei cefalo-faciale la adolescenți și tineri (13-17 ani)*, St cerc antropol, **27**, 11-18
- 3 Eleonora Luca, C Vulpe, Monica Petrescu, M Radu, N Leasevici, Lăcrămioara Mureșan, 2004, *Le développement métrique céphalo-facial des enfants sourd-muets d'une école spéciale Bucarestois*, Ann Roum Anthropol, **41**, 13-17
- 4 *** *Utilisation et interprétation de l'anthropométrie*, 1995, Rapport d'un comité OMS d'experts, Genève, Suisse

Institut d' Anthropologie «Francisc I Rainer»,
Bucarest, eleonluca@yahoo.com

THE ASSISTED REPRODUCTION – AN ANTHROPOLOGICAL APPROACH

CORNELIA RADA

The attempts to make sense of the new reproductive techniques (NRTs) create fundamental ethical, legal and social issues for society in general and clinicians in particular. The fact was outlined and approached in both cultural and medical anthropology studies. In this study we approach the problem raised by the new reproductive technologies to a sample of 1902 subjects from urban area in Romania. We analyze the variability by gender, age groups, place of residence, instruction level regarding perception and degree of agreement, opinion about the appropriate age and marital status of those who may appeal to the assisted reproduction. The statistical data are analyzed using SPSS statistical package program, we employ the Pearson Chi-Square test, nonparametric Kruskal-Wallis Test and the Cluster Analysis regarding the agreement with NRTs

ARGUMENT

The Assisted Reproductive Technology (ART) or the New Reproductive Technologies – (NRTs), replace a missing chain link of the normal reproductive mechanism offering a chance to the infertile persons, wishing to have children. The ethical norms and taboos of the sexuality, the dilemmas regarding moral status of the embryo or the foetus, the conflict of interest between the participants to the reproductive process – gametes donors, the host mother – all generated debates, polemics at least between physicians, anthropologists, geneticians, clerics, jurists and politicians.

The attempt to make sense of the new reproductive techniques (NRTs) creates fundamental ethical, legal and social issues for society in general and clinicians in particular. The fact was outlined and approached in both, the cultural and medical anthropology studies. Such studies accomplished in Europe, Australia, New Zealand and North America (Harris, Holm, 1998; Simpson 2001: 54–57).

In the last 20 years, such issues have been addressed to the authorities, councils and committees, now in place to monitor, regulate and advise on matters concerning the new reproductive and genetic technologies (NRGTs). The rapid development and growth of these technologies is characteristic, especially to the industrialized countries, but due to the ease technology and NRGTs information

transfer, this may gain the amplitude of a global phenomenon. But, can be noticed yet a time lag between the rapidity of the technology transfer process and the assimilation of these technologies into the local systems of morality, culture and belief. (Lock et al. 1995; Root Wolpe 1998).

Romania is not an exception in this respect because, as in many parts of the developed world, the new technologies are being put into place before concerns have been extensively debated, risks assessed and appropriate regulation responsibly agreed.

METHODOLOGY

In 2005–2006 period we initiated a research survey in the urban area, regarding sexual reproductive health, allocating a NRTs dedicated chapter, with the aim to determinate and asses the opinions and the attitudes in this respect. The used questionnaire had three items regarding perception, the agreement, the appropriate age and marital status of those who are entitled to use the assisted reproduction.

Without the pretension of the national level representatively, the stratified sample of 1902 subjects was established by the zone coverage criteria, of the seven traditional historical and geographical areas of Romania, in capital cities of the areas (counties) and the capital city of the country. The sample was also stratified also by sex and age groups, the resulted strata being distributed evenly and homogeneously (table 1).

Table 1

Basic sample structure in accordance with the stratification criteria

Gender	Place of residence	Age Group				Total
		15–24	25–34	35–49	over 50	
Female	București	28	29	42	28	127
	Timișoara	28	49	28	28	133
	Craiova	28	31	27	26	112
	Târgu Mureș	31	29	42	29	131
	Iași	25	29	29	30	113
	Constanța	28	28	28	28	112
	Baia Mare	28	29	31	30	118
	Ploiești	28	30	29	28	115
	Total	224	254	256	227	961
Male	București	28	28	28	28	112
	Timișoara	31	29	28	28	116
	Craiova	28	29	28	27	112
	Târgu Mureș	32	34	39	36	141
	Iași	28	28	29	29	114
	Constanța	28	29	27	28	112
	Baia Mare	28	30	28	25	111
	Ploiești	30	31	30	32	123
	Total	233	238	237	233	941

For statistical analysis purposes, three levels of instruction have been defined, such as they are used in the applied social statistics: low, medium and high. The resulted distribution of the respondents being: 23.3%, 43.5% and 33.1%, respectively.

The statistical data are analyzed using SPSS statistical package program and we employ the Pearson Chi-Square Test for each NRT and the nonparametric Kruskal-Wallis Test for overall seven technologies proposed to the respondents for assessments.

RESULTS

Perception and agreement with the NRTs

The subjects have been asked to answer if they heard about the 7 (seven) new reproductive technologies and to express their agreement or disagreement with these new technologies.

The majority of the respondents affirm that they are informed about the new reproductive technologies, the most known being the artificial insemination from husband (AIH) with 82.0% and the artificial insemination from donor (AID) with 77.6%. With respect to the agreement with these technologies, the most accepted are AIH with 28.0% and the *in vitro* fertilization, when the sperm and the egg are taken from partners (IFV) with 29.1%. The maximal disagreement is encountered for the technology called “Surrogate Mother”, which requires the acceptance of a woman to be inseminated with another woman’s husband sperm to bear a child, and to give birth and to give the child to the others to rise.

Further, we analyze the variability of NRTs perception as a function of gender, age group, education level, place of residence and analyze data with latent classes cluster analysis technique.

There are not significant differences by respondents’ gender with respect to the knowledge of the NRTs. With a single exception neither the degree of agreement with the NRTs does not significantly differ by gender. The exception is observed for the reproductive technique of the “surrogate mother” ($p < 0.001$). The proportion of the women that agreed with this method is almost half of the men proportion (table 2).

Table 2

Variability of the agreement by gender with Surrogate Mother technology

Surrogate Mother (A woman who agrees to be inseminated with another woman's husband sperm, to bear a child, to give birth and to give the child to the others to raise)	Agreement				Total
Gender	Don't Know	Disagree	Less Agree	Agree	
Female	47.6	55.1	47.9	36.5	50.5
Male	52.4	44.9	52.1	63.5	49.5
Total	100	100	100	100	100

The degree of NRTs knowledge statistically significantly differ by the age group ($p < 0.001$). the persons over 50 years being of less knowledge (table 3).

Table 3

Variability of the NRTs knowledge by age group

NRTs		Age Group				
		15-24	25-34	35-49	over 50	Total
AIH	No	24.5	18.7	19.8	37.0	100
	Yes	23.9	27.5	27.3	21.4	100
AID	No	23.9	18.3	20.0	37.8	100
	Yes	24.1	28.0	27.6	20.3	100
IVF with the sperm and egg from partners	No	26.1	19.3	19.5	35.0	100
	Yes	23.3	28.1	28.1	20.5	100
IVF with the sperm from partner and egg from donator	No	24.6	18.4	22.4	34.6	100
	Yes	23.7	29.5	27.6	19.1	100
IVF with the sperm from donator and egg from partner	No	24.3	18.4	22.1	35.2	100
	Yes	23.9	29.8	27.9	18.4	100
Surrogate mother	No	24.8	18.8	22.5	33.9	100
	Yes	23.6	29.6	27.7	19.1	100
Embryo Cryopreservation – embryo freezing for later use	No	23.8	22.6	22.7	30.9	100
	Yes	24.3	28.7	28.7	18.4	100

The degree of agreement with NRTs significantly differ by age group ($p < 0.001$), the degree of agreement being low for the persons over 50 years. With the exception of the AID, all the other methods are stronger agreed by the 25–34 years age group (table 4).

Table 4

Variability of the agreement with NRTs by age group

NRTs		Age Group				
		15–24	25–34	35–49	over 50	Total
AIH	Don't Know	24.2	22.2	21.4	32.3	100
	Disagree	23.8	19.4	27.5	29.3	100
	Less Agree	25.3	28.7	26.5	19.5	100
	Agree	22.7	30.3	28.6	18.4	100
AID	Don't Know	22.7	21.1	22.9	33.3	100
	Disagree	24.1	26.0	27.0	23.0	100
	Less Agree	23.8	30.5	26.9	18.8	100
	Agree	27.9	26.5	28.4	17.2	100
IVF with the sperm and egg from partners	Don't Know	24.9	21.8	21.3	32.0	100
	Disagree	24.9	18.5	26.8	29.8	100
	Less Agree	22.5	29.9	29.7	18.0	100
	Agree	23.8	31.2	27.3	17.7	100
IVF with the sperm from partner and egg from donator	Don't Know	23.5	20.5	22.8	33.1	100
	Disagree	24.9	26.0	27.3	21.9	100
	Less Agree	22.9	31.5	28.0	17.6	100
	Agree	26.8	30.4	28.0	14.9	100
IVF with the sperm from donator and egg from partner	Don't Know	22.8	21.1	23.2	33.0	100
	Disagree	25.0	26.1	27.7	21.2	100
	Less Agree	24.1	31.1	27.2	17.6	100
	Agree	26.2	30.2	27.3	16.3	100
Surrogate mother	Don't Know	22.4	21.0	21.9	34.7	100
	Disagree	25.8	27.4	27.8	18.9	100
	Less Agree	22.9	28.9	28.3	20.0	100
	Agree	21.9	33.3	27.1	17.7	100
Embryo Cryopreservation - embryo freezing for later use	Don't Know	21.9	24.9	23.6	29.7	100
	Disagree	26.7	23.0	28.7	21.7	100
	Less Agree	26.7	28.2	27.0	18.1	100
	Agree	21.8	35.9	27.1	15.3	100

The Kruskal-Wallis test identifies between 25–29 years, the most permissive respondents to the new reproductive methods and, so far as the age group increases towards 60 years, the agreement degree decreases ($H=20.10$, $df=7$, $p<0.001$).

The NRTs knowledge significantly differs by instruction level, and it increases with the instruction level increase ($p<0.001$) (table 5).

Table 5

Variability of the NRTs knowledge by the instruction level

NRTs		Instruction level			
		Low	Medium	High	Total
AIH	No	43.4	44.3	12.2	100
	Yes	18.9	43.4	37.7	100
AID	No	44.4	42.7	12.9	100
	Yes	17.3	43.8	39.0	100
IVF with the sperm and egg from partners	No	43.6	44.0	12.3	100
	Yes	16.4	43.4	40.3	100
IVF with the sperm from partner and egg from donator	No	36.8	46.4	16.8	100
	Yes	16.8	42.1	41.1	100
IVF with the sperm from donator and egg from partner	No	36.6	46.2	17.2	100
	Yes	16.4	42.1	41.5	100
Surrogate mother	No	37.1	45.4	17.5	100
	Yes	16.1	42.5	41.4	100
Embryo Cryopreservation - embryo freezing for later use	No	32.9	44.3	22.7	100
	Yes	15.0	42.8	42.1	100

Also, the degree of the agreement with NRTs is significantly influenced by the instruction level, increasing with the instruction level increase ($p<0.001$) (table 6).

Table 6

Variability of the agreement with NRTs by the instruction level

NRTs		Instruction level			
		Low	Medium	High	Total
AIH	Don't Know	37.1	43.3	19.6	100
	Disagree	27.5	42.9	29.6	100
	Less Agree	18.4	44.9	36.7	100
	Agree	13.2	42.7	44.2	100
AID	Don't Know	36.4	43.5	20.2	100
	Disagree	21.1	45.0	34.0	100
	Less Agree	16.3	44.0	39.7	100
	Agree	13.2	38.2	48.5	100

(cont. table 6)

IVF with the sperm and egg from partners	Don't Know	37.5	43.8	18.7	100
	Disagree	21.8	43.7	34.5	100
	Less Agree	19.6	44.9	35.5	100
	Agree	12.5	42.1	45.5	100
IVF with the sperm from partner and egg from donator	Don't Know	34.3	44.9	20.8	100
	Disagree	19.3	45.0	35.7	100
	Less Agree	16.4	42.9	40.7	100
	Agree	12.5	35.1	52.4	100
IVF with the sperm from donator and egg from partner	Don't Know	34.1	45.7	20.2	100
	Disagree	19.7	44.3	35.9	100
	Less Agree	15.5	43.4	41.1	100
	Agree	12.8	32.6	54.7	100
Surrogate mother	Don't Know	35.6	45.2	19.2	100
	Disagree	19.4	44.0	36.6	100
	Less Agree	13.3	41.0	45.7	100
	Agree	12.5	37.5	50.0	100
Embryo Cryopreservation - embryo freezing for later use	Don't Know	31.9	43.7	24.4	100
	Disagree	18.8	46.1	35.1	100
	Less Agree	14.1	42.0	43.9	100
	Agree	12.4	37.1	50.6	100

Moreover, the non parametric Kruskal-Wallis test highlights that the instruction level has a direct and significant influence on the acceptance degree of the reproductive technologies. All the 7 technologies are more accepted as the level of instruction increases. The differences regarding the degree of acceptance of the reproductive technologies, measured by the overall score, obtained for all the 7 proposed technologies, between the places of residence and the age groups, are also significant. The degree of agreement with these technologies is higher in Constanța and lower in Iași and Craiova (Kruskal-Wallis $H = 38.67$, $df = 7$, $p = 0 < 0.001$).

Cluster Analysis regarding the agreement with NRTs

In this analysis we retained from the basic sample only a sub sample of 310 subjects, respondents that classified their degree of agreement with NRTs, by answering with "Disagree" or "Agree" to the all 7 proposed methods. The latent class cluster analysis indicates as a best fit model, the model with 3 clusters, different in respect with NRTs acceptance attitude. In the figure 1, each cluster's profile is indicated by the total agreement (Agree) probability with each reproductive technology.

First cluster (cluster 1) is an “**exclusivist**” one, which includes 55% of the subjects, being characterized by **total disagreement** with all the 7 reproductive technologies proposed.

The second cluster (cluster 2) is a “**liberal**” one, which includes 31.5% of the subjects, being characterized by **total agreement** with all the 7 reproductive technologies proposed.

The third cluster (cluster 3) is a “**conservator**” one, which conserves the reproductive act within the intimate universe of the family, the husband and the wife. The cluster includes 13.5% of the subjects and is characterized by the agreement with those technologies which do not involve the third person outside the couple (the donor) respectively: the artificial insemination from husband and IVF with the sperm and egg from partners.

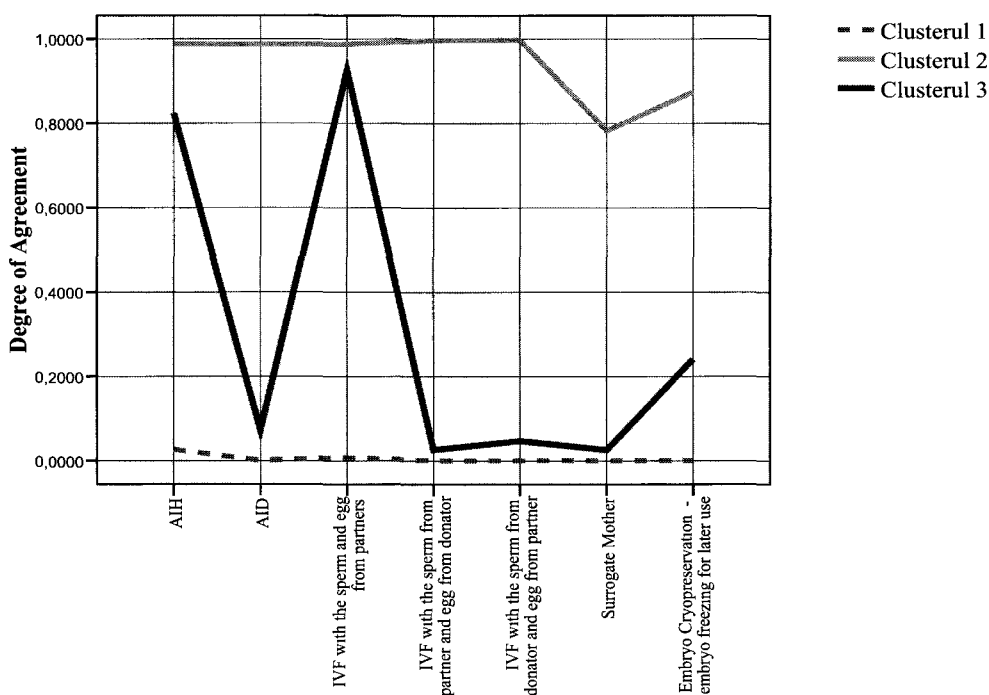


Figure 1 – Clusters’ profiles in respect with NRTs agreement.

Marital status and the appropriate age of those who may use the assisted reproduction

In the respondents’ opinion the reproductive technologies should be used mainly by married persons. As regards the persons living in consensual union or the single persons, the opinions are not decisive, in the favor or not, of these technologies usage (table 7).

Table 7

Usage addressability of NRTs depending on marital status

Who do you consider that may use such methods	No	Yes	Total (%)
Married persons	15.8	84.2	100
Consensual union persons	56.3	43.7	100
Single unmarried persons	44.6	55.4	100

The appropriate age for new reproductive technologies was considered starting with 18 years up to 60 years, the majority of the respondents indicating an age interval when such method may be used. The attention is drawn by an important category of persons that did not indicate an age group but they specified instead “at youth” or “maximum 40 years”. As can be noticed in the table 8, the highest proportion is of those who consider that such technologies should not be used before 35 years. Thereby, it is suggested that a couple should try first to procreate by natural means, the assisted reproduction being an extreme and later solution.

Table 8

Opinions regarding the appropriate age for new reproductive technologies

Opinions regarding the appropriate age for new reproductive technologies	Frequencies	%
Not before 18 years	17	0.9
Not before 20-25 years	472	24.8
Not before 30-35 years	603	31.7
Not before 40 years	155	8.1
Never	17	0.9
Total	1264	66.5
Don't know or Non response	638	33.5
Total	1902	100

CONCLUSIONS AND DISCUSSIONS

The development and the rapid growth of the assisted reproduction are characteristic to the economically developed countries, but due to the ease of technology and NRTs information transfer, this may get the amplitude of a global phenomenon. Like other authors studies, our study underlines that the lag between the technology transfer process and the its assimilation at local level is due to specificity of the moral, cultural and religious systems (Lock et al. 1995; Root Wolpe 1998).

Communally, it is claimed that the right to the assisted reproduction, if such right exists, belongs more to the married couples, fact which is reflected in the our respondents' opinion that in majority considered that NRTs must be used by married couples (82.2%). Starting with the fact that the right to the reproduction is based on the assumption that the desire to reproduction is the basic expression of individual's moral autonomy, it is not clear if there is any ethically significant difference between the centrality of that desire to the lives of a married couple and to that of an unmarried couple (Golombok et al. 1983: 551–572; The Ethics Committee of the American Society for Reproductive Medicine 2006: 1333–1335).

The major absence of significant differences by gender regarding the knowledge and the agreement with NRTs reflects the fact that in this problem, with one exception, is more linked by the instruction level, the age and the local cultural pattern. The exception given by the surrogate mother method, whereby a woman acceptances to be inseminated with the one husband's sperm, bears a child, gives birth and gives the child to others to raise ($p < 0.001$), where the women's proportion that does not agree with the method is almost half of men's proportion, suggests like other studies, that beyond the IVF treatment, this puts an ideological pressure to woman, which enforce the believe that the main social role of women is still primarily defined as the breeders and rear of children.

The optimum age, when might to apply for the new reproductive technologies, is beyond to the medical aspect that the specialist decides. The rights, to carry out the autonomy of the woman like moral agent for the assisted reproduction, of couples married or living in consensual union, the optimal age, are based also on social aspects with implications in child's live route and not only.

This aspect was expressed also in our respondents' opinion by indicating a maximum threshold of 40 years, which was also found in other studies that highlighted the social and medical risks of the assisted reproduction at late ages (Bowman & Saunders 1994: 167–171; Lister Hill 2003: 1006–1014).

In Romania, like in other developed countries, the new reproductive technologies entered into practice before to be largely debated, the risks assessed and before the appropriate regulation agreed with responsibility. The management of these technologies involves highly sensitive personal information to be provided and supposes a robust system of record keeping data for the private and confidential information, many of the respondents feeling the need to express their anxiety regarding these aspects.

Albeit is not based on a scientific fundamental, the opinion has a certain stability and is not a momentary reaction, but is derived in a large extent from the particular traits of the individual's social personality. Being in a network of social relations linked by age, gender, place of residence, profession and other relation, the individual expresses his opinion under their influence. In contrast with the public, that is a sociological fact, with numerical dimensions, the public opinion is

a psychosocial fact. Although the opinion is the verbal expression of the attitude, they are distinct. What the individuals are prone to do is expressed in attitude, what the individuals consider that is true is expressed in opinion, this disclosing a latent attitude, which can also imply the disposition to act such. The respondents' opinion can be a base for collecting information, planning and indication of legislative recommendations, with the aim to establish strategies for such activity, which can ensure the right to reproduction springing from a basic human need and desire.

REFERENCES

- Bowman M C , Saunders D M 1994, *Community attitudes to maternal age and pregnancy after assisted reproductive technology too old at 50 years?*, Human Reproduction, **9** (1), p 167–171
- Golombok S , Spencer A , Rutter M , 1983, *Children in lesbian and singleparent households psychosexual and psychiatric appraisal*, J Child Psychol Psychiatry, **24**, p 551–572
- Harris J , Holm S (eds) 1998, *The future of human reproduction ethics, choice and responsibility*, Oxford University Press, Oxford
- Lister Hill, 2003, *Pregnancy After 50 More Risky Than We Thought ?*, Obstetrics and Gynecology, **14** (1), p 1006–1014
- Lock M , Young A , Cambrosio A (eds) 1995, *Living and working with the new medical technologies intersection of inquiry*, Cambridge University Press , Cambridge
- Root Wolpe P 1998, *The triumph of autonomy in American bioethics a sociological view* In De Vries R, Subedi J, eds *Bioethics and society* , Prentice Hall, New Jersey
- Simpson B 2001, *Ethical regulation and the new reproductive technologies in Sri Lanka perspectives of ethical review committee members* Ceylon Medical Journal, **46**, p 54–57
- *** 2006, *The Ethics Committee of the American Society for Reproductive Medicine, American Society for Reproductive Medicine, Access to fertility treatment by gays, lesbians, and unmarried persons* (Birmingham, Alabama), American Society for Reproductive Medicine, **86**, p 1333–1335

„Francisc I Rainer” Institute of Anthropology,
Bucharest, corneliarada@yahoo.com

COMPORTEMENT ALIMENTAIRE ET ÉTAT NUTRITIONNEL DES ADOLESCENTS FRANÇAIS¹

F ROVILLE-SAUSSE

Introduction puberty is one period of transformation during which the increase of size and weight is fastest of the life (except the 0–1 year period). This development requires a considerable energy contribution and makes the human body very vulnerable to any food imbalance. It is also a period of hormonal changes which have an influence on the growth, increase the appetite and modify the body composition. In the boy as in the girl, an insufficient supply in quantity or quality can delay the sexual development and decelerate the growth and osseous maturation. In addition, food imbalance forms part of the factors of major risk to develop a cardiovascular disease, which constitutes a priority of public health. The objective of this research was to study the changes (improvement) of food behavior in a group of teenagers who had taken part during several months, with their professor of life sciences, with a research task on the food and health.

Method in 2006, an investigation was carried out in a college of the Paris area, near 130 teenagers from 12 to 16 years. Each girl and each boy were weighed and measured in order to determine their nutritional state by the body mass index (BMI). Each young person made the Kidmed test, in order to evaluate the weekly food behavior. From a questionnaire of 16 items whose values are added, one can make a classification of the diet in three groups: very bad quality, need for improvement, optimal diet. Lastly, a food consumption survey of "recall of the last 24 hours" type was carried out, in order to evaluate the daily nutritional intakes (individual and average), and to compare them with the advised nutritional contributions (ANC).

Results with the Kidmed test, the answers of the girls and boys were not significantly different. On the other hand, there was a difference related to the age (better scores among the teenagers <14 years) and to the BMI (better scores among the teenagers in overweight). The evaluation of the daily nutritional intakes shows an unbalanced food. It thus seems that the work of investigation undertaken with their professor of life sciences was profitable since they have a good knowledge of the concept of healthy food. But the change of behavior will be progressive.

INTRODUCTION

La puberté est une période de transformations durant laquelle le développement staturo-pondéral est le plus rapide de la vie (excepté la période de 0–1 an). Chez

¹ Recherche soutenue par le Programme International de Coopération Scientifique franco-roumain PICS n°4341

les filles, la puberté débute vers 10 ans. De 10 à 15 ans, la croissance moyenne est de 23 cm et la prise de poids de 21 kg (environ 12 kg de masse maigre et 9 kg de masse grasse). Chez les garçons, la puberté débute vers 12 ans et la croissance moyenne durant 5 ans est de 26 cm avec un gain de poids de 26 kg (23 kg de masse maigre et seulement 3 kg de masse grasse). Ce développement nécessite un apport énergétique considérable et rend l'organisme très vulnérable à tout déséquilibre alimentaire. Cette période est également profondément marquée par d'importants bouleversements hormonaux qui ont une influence sur la croissance, majorent l'appétit et modifient la composition du corps. Les besoins protéiques sont également augmentés pendant la puberté. Mais il faut aussi tenir compte de la qualité des protéines ingérées et les experts recommandent qu'au moins un quart des protéines soient d'origine animale. Dans les pays occidentaux, les besoins sont généralement largement couverts. L'adolescence est aussi une période importante pour l'édification du squelette, 50% du capital osseux se constitue durant cette période. Les apports conseillés en calcium entre 10 et 18 ans sont les plus élevés (1200 mg/jour). Enfin, les besoins en vitamines et en minéraux sont également plus importants pendant l'adolescence que pendant l'enfance. Il faut particulièrement être attentif aux apports en fer. A cette période de la vie, les besoins en fer sont identiques à ceux des adultes. Or, en France, environ 12% des adolescents sont carencés en fer. Chez le garçon comme chez la fille, une alimentation insuffisante en quantité ou en qualité peut retarder le développement sexuel et ralentir la croissance et la maturation osseuse. D'autre part, le déséquilibre alimentaire fait partie des facteurs de risque majeur de développer une maladie cardio-vasculaire, ce qui constitue une priorité de santé publique. Le surpoids et l'obésité des adolescents constituent un problème majeur en France. Des études épidémiologiques montrent une évolution rapide de la prévalence du surpoids et de l'obésité des adolescents en France. Pour la classe d'âge des 14-15 ans scolarisés en classe de 3^{ème}, la prévalence globale du surpoids (obésité incluse) est de 15%, avec une prévalence de l'obésité de 3.3% (De Peretti, Castetbon 2004: 1–7).

OBJECTIF

L'objectif de cette étude était d'étudier les changements (amélioration?) de comportements alimentaires d'un groupe d'adolescents qui avaient participé pendant plusieurs mois, avec leur professeur de sciences de la vie, à un travail de recherche sur l'alimentation et la santé. La question était de savoir si les connaissances des notions d'équilibre alimentaire, de besoins et d'apports nutritionnels, de dépenses énergétiques de ces adolescents étaient en adéquation avec leurs pratiques quotidiennes. Cela permettrait de déterminer si l'adolescence est une période propice à une éducation nutritionnelle.

MÉTHODE

1) L'indice de masse corporelle. Une enquête a été réalisée dans un collège de la région parisienne, auprès de 127 adolescents âgés de 11 à 16 ans: 63 garçons et 64 filles. Chaque fille et chaque garçon a été pesé et mesuré afin de déterminer leur état nutritionnel par l'indice de masse corporelle ($IMC = T/P^2$). Les références américaines du National Centre for Health Statistics (CDC 2000) ont été utilisées pour déterminer les insuffisances pondérales ($IMC < 3^{ème}$ percentile), les poids normaux ($3^{ème}$ percentile $< IMC < 97^{ème}$ percentile) et les surpoids ($IMC > 97^{ème}$ percentile). Il est à noter que le $97^{ème}$ percentile de la distribution française (Rolland-Cachera 1991: 13–21) et le $85^{ème}$ percentile des normes américaines (Rolland-Cachera 2001: 108–112) ont des valeurs très voisines. Le $85^{ème}$ percentile des normes américaines a été recommandé comme valeur d'identification du risque de surpoids et d'obésité chez les enfants et les adolescents (Himes, Dietz 1994: 307–316; Barlow, Dietz 1998: 1–11). En 2000 (Cole et al. 2000: 1240–1243), l'International Obesity Task Force (IOTF) a défini comme limites inférieurs du surpoids et de l'obésité des enfants et des adolescents les courbes qui aboutissent aux valeurs respectives de 25 et 30 kg/m^2 à 18 ans. Le percentile IOTF C-25 correspond au $85^{ème}$ percentile NCHS et le percentile C-30 correspond au $97^{ème}$ percentile NCHS.

2) Le Kidmed. Chaque adolescent a fait un test Kidmed (Tableau I), afin d'évaluer son comportement alimentaire hebdomadaire. A partir d'un questionnaire de 16 items dont les valeurs s'additionnent, on peut faire un classement de la diète en trois groupes: très mauvaise qualité, besoin d'amélioration, diète optimale (Serra-Majem 2004: 931–935; Montero 2006: 189–197). Dans les pays dont la population est plutôt sédentaire, la signification contemporaine d'une nutrition optimale est en rapport avec les objectifs de réduction des maladies chroniques, réduction de la morbidité et amélioration de la qualité de la vie.

Tableau I test de qualité de la diète ou indice Kidmed pour les enfants et les adolescents [8]

Table I Quality diet test or Kidmed index for childhood and adolescence [8]

Un fruit ou un jus de fruit frais chaque jour	+ 1
Un second fruit chaque jour	+ 1
Un légume cru ou cuit chaque jour	+ 1
Plus d'un légume cru ou cuit chaque jour	+ 1
Poisson régulièrement (2 à 3 fois/semaine)	+ 1
Repas pris une fois ou plus /semaine dans un "fast food"	– 1
Légumes secs régulièrement	+ 1
Pâtes, riz, semoule au moins 5 fois/semaine	+ 1
Céréales ou dérivés (pain, etc) au petit déjeuner	+ 1
Fruits secs au moins 2 à 3 fois/ semaine	+ 1
Utilisation de l'huile d'olive à la maison	+ 1
Vous "sautez" le petit déjeuner	– 1
Un produit laitier (lait, yoghourt, etc) au petit déjeuner	+ 1
Viennoiseries au petit déjeuner	– 1
2 yoghourts et/ou 40 g de fromage/jour	+ 1
Confiseries et pâtisseries plusieurs fois par jour	– 1

3) Consommation et apports nutritionnels. Enfin, une enquête alimentaire de type "interrogatoire de rappel des dernières 24 heures" a été réalisée (Delafosse 1998: 99–125), afin d'estimer les apports nutritionnels journaliers individuels et moyens, et de les comparer aux apports nutritionnels conseillés (ANC, 2001) (Martin 2001). Cette méthode permet de définir les habitudes alimentaires d'une population. Lors d'un entretien direct individuel d'une durée de 30 à 40 minutes, à l'école, l'enquêteur demandait à chaque adolescent de décrire la prise alimentaire des 24 heures précédentes. L'estimation exacte des portions était réalisée à l'aide d'un atlas photographique (Hercberg 2002). Cette méthode est valable pour estimer les habitudes alimentaires d'une population et elle complète le test Kidmed qui a été appliqué en même temps et par le même enquêteur.

Les apports individuels ont été évalués à l'aide du logiciel RM et des tables de composition des aliments (Favier 1995). Ils ont été comparés aux ANC pour les classes d'âges respectives et en fonction du sexe.

RÉSULTATS

1) L'indice de masse corporelle (Tableau II et Fig. 1).

Sur l'ensemble des 127 adolescents étudiés, 2% ont un IMC < 3^{ème} percentile de leur classe d'âge et sont considérés comme étant en insuffisance pondérale, 83% ont un IMC compris entre le 3^{ème} et le 85^{ème} percentile de leur classe d'âge et ont un poids standard, 10% sont en surpoids et 5% sont obèses (IMC > 97^{ème} percentile). Pour la suite du travail, deux catégories d'adolescents sont considérées en fonction de leur IMC: les adolescents sans surpoids (insuffisance pondérale + poids standard = 85%) et les adolescents avec surpoids (surpoids + obésité = 15%).

Parmi les adolescents en surpoids, 13% sont des garçons et 17% sont des filles. Le pourcentage de surpoids est plus élevé chez les jeunes âgés de 11 à 13 ans (17%) que chez ceux qui ont entre 14 et 16 ans (13%).

Tableau II: Indice de masse corporelle (moyenne et écart-type) en fonction de l'âge
Table II: The Body mass index (means and standard deviation) according to the age

Age en années	G a r ç o n s		F i l l e s	
	moyenne	σ	moyenne	σ
11	17.5	2.8	18.8	1.7
12	21.3	4.6	19.1	3.6
13	19.3	2.6	19.9	3.9
14	21.2	3.7	21.4	4.9
15	21.3	1.7	21.5	3.9
16	21.3	3.6	—	—

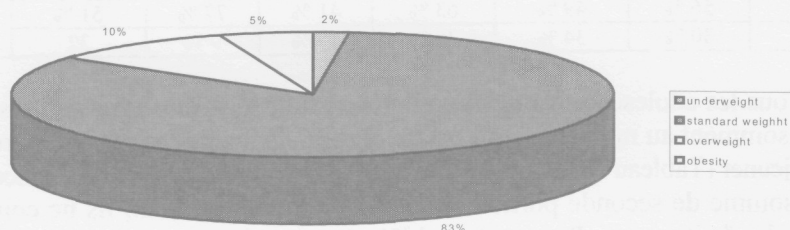


Fig. 1: Distribution (%) of the BMI of the adolescents

Fig. 1: Distribution (%) de l'IMC des adolescents

2°) Le test Kidmed

La note moyenne obtenue au test Kidmed est 6.3 ($\sigma = 2.5$), aussi bien pour l'ensemble de l'échantillon que pour chaque sexe étudié séparément. Il existe une différence significative en fonction de l'âge. La note obtenue par les 11–13 ans (7.0; $\sigma = 2.6$) est meilleure que celle obtenue par les 14–16 ans (5.4; $\sigma = 2.0$). La note des adolescents en surpoids est un peu supérieure à celle des adolescents sans surpoids. La différence n'est pas significative.

Dans l'ensemble de l'échantillon (Tableau III), 14% des adolescents ont une note inférieure ou égale à 3 (diète de mauvaise qualité), ce pourcentage étant plus élevé parmi les filles que parmi les garçons. Il est remarquable qu'aucun adolescent en surpoids n'ait une mauvaise conduite alimentaire. La note la plus fréquemment obtenue dans le Kidmed est comprise entre 4 et 7 (diète de moyenne qualité, apporter des améliorations), sauf si on tient compte de l'âge des adolescents. En effet, le pourcentage de notes égales ou supérieures à 8 (diète optimale en adéquation avec une alimentation de type méditerranéen traditionnel, favorable à une bonne hygiène de vie) est significativement plus élevé parmi les adolescents de 11–13 ans (45%) que parmi ceux de 14–16 ans (9%).

Tableau III Indice Kidmed note obtenus en fonction du sexe, de l'âge et de l'IMC
 Table III Kidmed test note obtained according to the sex, age and BMI

Indice Kidmed	Total	Garçons	Filles	< 14 ans	> 14 ans	Sans surpoids	Avec surpoids
< ou = 3	14 %	17 %	12 %	14 %	14 %	17 %	0 %
4 à 7	56 %	49 %	63 %	41 %	77 %	51 %	83 %
= ou > 8	30 %	34 %	25 %	45 %	9 %	32	17 %

Tous les adolescents (100%) qui ont une note au Kidmed égale ou supérieure à 8 consomment au moins un fruit et une portion de légume par jour, et prennent un petit déjeuner (Tableau IV). Aucun (0%) adolescent ayant une note au kidmed < ou = 3 ne consomme de seconde portion de légume quotidiennement; ils ne consomment jamais de fruits secs. Par contre, 50% des jeunes qui ont une diète pauvre s'alimentent régulièrement au moins une fois par semaine dans un restaurant de fast-food, et 50% ne prennent jamais de petit déjeuner.

Tableau IV Fréquences de consommateurs (%) en fonction de l'indice Kidmed
 Table IV Frequencies of the consumers (%) according to the Kidmed index

	Indice < ou = 3	Indice 4 - 7	Indice = ou > 8
Un fruit ou un jus de fruit frais chaque jour	75	87	100
Un second fruit chaque jour	25	28	56
Un légume cru ou cuit chaque jour	42	89	100
Plus d'un légume cru ou cuit chaque jour	0	38	68
Poisson régulièrement (2 à 3 fois/semaine)	25	43	68
Repas pris une fois ou plus /semaine dans un "fast food"	50	21	8
Légumes secs régulièrement	25	47	92
Pâtes, riz, semoule au moins 5 fois/semaine	83	81	80
Céréales ou dérivés (pain, etc .) au petit déjeuner	33	64	96
Fruits secs au moins 2 à 3 fois/ semaine	0	13	36
Utilisation de l'huile d'olive à la maison	33	64	92
Vous "sautiez" le petit déjeuner	50	13	0
Un produit laitier (lait, yoghourt, etc) au petit déjeuner	33	68	92
Viennoiseries au petit déjeuner	42	38	28
2 yoghourts et/ou 40 g de fromage/jour	42	74	96
Confiseries et pâtisseries plusieurs fois par jour	50	55	12

Les adolescents de 14–16 ans sont deux fois plus nombreuses (tableau V) à fréquenter les restaurants de "fast-food" que ceux de 11–13 ans. La consommation de fruits secs et de légumes secs, la consommation de céréales et de produits laitiers au petit déjeuner diminuent avec l'âge. Par contre, la consommation de viennoiseries industrielles et surtout de confiseries augmentent significativement. D'autre part, si la note moyenne au Kidmed est la même pour les filles et pour les garçons, dans chaque catégorie d'âges, on remarque des différences de détail significatives. Les garçons de 14–16 ans vont plus fréquemment au fast-food (57% vs 14%) et les filles consomment davantage confiseries (71% vs 50%).

Tableau V Fréquences de consommateurs (%) en fonction de leur âge
Table V Frequencies of the consumers (%) according to the age of the adolescents

	11–13 ans	14–16 ans
Un fruit ou un jus de fruit frais chaque jour	92	86
Un second fruit chaque jour	33	40
Un légume cru ou cuit chaque jour	88	83
Plus d'un légume cru ou cuit chaque jour	39	46
Poisson régulièrement (2 à 3 fois/semaine)	49	46
Repas pris une fois ou plus /semaine dans un "fast food"	14	31
Légumes secs régulièrement	65	46
Pâtes, riz, semoule au moins 5 fois/semaine	80	83
Céréales ou dérivés (pain, etc.) au petit déjeuner	76	60
Fruits secs au moins 2 à 3 fois/semaine	22	11
Utilisation de l'huile d'olive à la maison	67	69
Vous "sautiez" le petit déjeuner	12	17
Un produit laitier (lait, yoghourt, etc.) au petit déjeuner	78	60
Viennoiseries au petit déjeuner	29	46
2 yoghourts et/ou 40 g de fromage/jour	82	69
Confiseries et pâtisseries plusieurs fois par jour	27	63

Bien que la note moyenne au test des adolescents avec ou sans surpoids soit quasiment égale, le tableau VI montre des fréquences significativement différentes d'habitudes alimentaires. Aucun adolescent en surpoids de cette enquête ne mange régulièrement dans un restaurant "fast food" (26% parmi les normopondéraux). Le taux de consommateurs de pâtes ou riz au moins 5 fois par semaine est beaucoup plus faible parmi les jeunes en surpoids (58%) que parmi les autres (84%). Une majorité d'adolescents en surpoids consomment de l'huile d'olive (83%, vs 64% parmi les normopondéraux). Le poids n'a pas d'incidence sur l'habitude de prendre un petit déjeuner quotidiennement. Par contre la composition du petit déjeuner est différente: parmi les jeunes en surpoids, la fréquence de consommateurs de produits laitiers et de céréales est inférieure à celle des jeunes de poids normal.

Tableau VI Fréquences des consommateurs (%) en fonction de leur IMC
Table VI Frequencies of the consumers (%) according to the BMI

	Poids standards	Surpoids
Un fruit ou un jus de fruit frais chaque jour	90	91
Un second fruit chaque jour	36	33
Un légume cru ou cuit chaque jour	86	91
Plus d'un légume cru ou cuit chaque jour	43	42
Poisson régulièrement (2 à 3 fois/semaine)	47	58
Repas pris une fois ou plus /semaine dans un "fast food"	26	0
Légumes secs régulièrement	58	42
Pâtes, riz, semoule au moins 5 fois/semaine	84	58

(cont tableau VI)

Céréales ou dérivés (pain, etc) au petit déjeuner	70	58
Fruits secs au moins 2 à 3 fois/ semaine	17	25
Utilisation de l'huile d'olive à la maison	64	83
Vous "sautez" le petit déjeuner	14	16
Un produit laitier (lait, yoghourt, etc) au petit déjeuner	71	58
Viennoiseries au petit déjeuner	36	42
2 yoghourts et/ou 40 g de fromage/jour	74	83
Confiseries et pâtisseries plusieurs fois par jour	43	33

Dans une enquête alimentaire, il ne faut pas oublier les boissons (Tableau VII), qui peuvent être une source importante d'apports en sodium (boissons gazeuses) ou en sucres (jus de fruits et sodas). Dans l'échantillon de l'étude, 14% des adolescents ne consomment jamais de boissons sucrées, ni de boissons contenant des hydrates de carbone. On constate que taux de consommation des boissons sucrées est plus élevé parmi les filles que parmi les garçons, tandis que la consommation des boissons gazeuses est plus fréquente chez les garçons. Les différences sont significatives (χ^2 , $p < 0,001$).

Tableau VII Fréquences de consommateurs (%) de boissons quotidiennes

Table VII Frequencies of the consumers (%) of daily beverages

Boissons	Filles	Garçons	Total
Eau courante	71 %	57 %	63 %
Eau peu minéralisée	57 %	76 %	69 %
Eau minérale gazeuse	7 %	24 %	17 %
Jus de fruit frais	71 %	67 %	69 %
Sirup de fruit	43 %	29 %	34 %
Sodas	43 %	67 %	60 %

3) Les apports nutritionnels

Les apports énergétiques quotidiens moyens des filles et des garçons ont été évalués (Tableau VIII). Ils sont inférieurs aux apports nutritionnels conseillés (Feinberg 2001), dans toutes les catégories d'âges. Cependant, il faut rappeler que l'apport nutritionnel conseillé (Martin 2001) est égal au besoin nutritionnel moyen, auquel sont ajoutés deux écarts types représentant la marge de sécurité statistique pour prendre en compte la variabilité interindividuelle et permettre de couvrir les besoins de la plus grande partie de la population (97.5% des individus). Ainsi, l'apport nutritionnel conseillé a été choisi sur la base de 130% du besoin moyen. Dans ces conditions, on peut considérer que les apports énergétiques moyens des adolescents de cette étude sont adéquats, s'ils ont une morphologie habituelle et s'ils sont en bonne santé.

Tableau VIII· Apports énergétiques en fonction de l'âge et du sexe

Table VIII· Energy intakes according to the age and the sex.

	Apports énergétiques (Kcal)			Protéines (%) (standard: 11–15%)	Glucides (%) (standard: 50–55%)	Lipides (%) (standard: 30–35%)
	moy.	σ	standard			
Filles 10–12 years	1589	533	1950	17	51	32
Filles 13–15 years	1735	616	2140	18	48	34
Filles 16–19 years	1811	550	2140	19	50	31
Garçons 10–12 years	1871	836	2190	17	49	34
Garçons 13–15 years	2137	821	2480	19	51	30
Garçons 16–19 years	–	–	2680	–	–	–

Les nutritionnistes préconisent une répartition particulière des apports énergétiques quotidiens pour équilibrer l'alimentation (Martin 2001). Ainsi, les protéines doivent représenter entre 11% et 15% des apports énergétiques totaux, les lipides: 30–35% et les glucides: 50–55%. On remarque que les apports en protéines sont supérieurs aux valeurs recommandées dans toutes les classes d'âges, et que la proportion augmente avec l'âge.

Une répartition précise entre glucides complexes et glucides simples est difficile à argumenter scientifiquement. Il est généralement conseillé de limiter les sucres et les produits sucrés à moins de 10% de l'apport énergétique total (soit environ 25% de l'ensemble des glucides). La forte consommation quotidienne de boissons sucrées (60%) et de confiseries (42%) augmente la proportion des glucides simples dans l'alimentation des adolescents (environ 20% de l'apport énergétique total).

L'estimation exacte des apports nutritionnels moyens à partir du rappel de consommation des dernières 24 heures est difficile à réaliser car la variabilité individuelle est très grande. Les apports en sodium des garçons sont plus élevés que ceux des filles (Tableau IX). Le sodium (Na) est généralement associé au chlore (Cl) sous la forme de chlorure de sodium (NaCl). Sachant que 400 g de sodium correspondent à une consommation de 1 g de sel, le tableau IX présente la consommation moyenne en sodium et son équivalent en sel. Les adolescents étaient incapables d'évaluer la quantité de sel de table rajoutée dans la cuisine et au moment des repas. La consommation moyenne évaluée est donc inférieure à la consommation réelle.

Tableau IX: Apports en oligo-éléments en fonction de l'âge et du sexe (réf: ANC, 2001)

Table IX: Oligo-elements intakes according to the age and to the sex

	Sodium (g)			Calcium (g)			Iron (mg)		
	Moy.	σ	NaCl	Moy.	σ	ref.	Moy.	σ	ref.
Filles 10-12 ans	1.7	0.8	4.3	0.9	0.3	1.0	8.6	3.4	12.0
Filles 13-15 ans	1.9	0.9	4.7	0.8	0.3	1.2	9.9	3.7	12.0
Garçons 10-12 ans	2.3	0.9	5.9	0.9	0.3	1.0	11.9	6.2	12.0
Garçons 13-15 ans	2.1	1.1	5.3	1.0	0.4	1.2	12.2	4.6	15.0

Les apports moyens en calcium sont satisfaisants. Dans le groupe d'âge 13-15 ans, ils sont supérieurs parmi les garçons.

Les apports en fer sont inférieurs aux valeurs de référence, avec une grande variabilité individuelle. Les apports des filles sont inférieurs à ceux des garçons.

Les apports minéraux en vitamine A rétinol sont satisfaisants (Tableau X). Ils sont supérieurs parmi les garçons. Par contre, les apports en pro-vitamine A ou β -carotène sont satisfaisants pour les filles, mais inférieurs aux ANC pour les garçons. Les apports moyens en β -carotène des garçons à 13-15 ans représentent seulement 51% des apports recommandés.

Les apports en vitamine C sont significativement supérieurs aux apports recommandés dans toutes les classes d'âges et pour les deux sexes.

Tableau X: Apports en minéraux en fonction de l'âge et du sexe (réf: ANC, 2001)

Table X: Minerals intakes according to the age and to the sex (ref: ANC, 2001)

	Retinol (μ g)			β -carotène (μ g)			Vitamine C (mg)		
	Moy.	σ	ref.	Moy.	σ	ref.	Moy.	σ	ref.
Filles 10-12 ans	235	105	320	2245	1011	2880	77	74	60
Filles 13-15 ans	285	111	320	2132	1253	2880	102	91	70
Garçons 10-12 ans	353	121	320	1634	1192	2880	137	53	60
Garçons 13-15 ans	282	123	400	1843	1012	3600	122	96	70

DISCUSSION

Selon l'enquête sur les comportements liés à la santé chez les enfants, le pourcentage de garçons et de filles de 13 à 15 ans en surcharge pondérale oscille entre 3 et 30% en fonction des pays et des régions (WHO Europe 2005; Mathieson, Koller 2006). Cette augmentation accompagne de façon constante le développement socio-économique et l'urbanisation des pays (Basdevant, Ricquier 2003; Wang et

al 2002 971–977) (*These studies identified a particularly high prevalence of overweight in countries located in North America, the United Kingdom and South-western Europa Scandinavian and central European countries had a lower proportion of overweight adolescents, and the prevalence in the Baltic states and the eastern half of the WHO European Region*) La prévalence du surpoids dans la présente étude (15%) se situe dans la moyenne de la population française Mais si on tient compte de la région de l'étude (banlieue parisienne), la prévalence du surpoids dans l'échantillon présent est significativement supérieure à la moyenne (< 5%) En effet (Poulain 2002), la région est très discriminante dans la distribution de la corpulence et la région parisienne a le plus faible taux de surpoids et d'obésité de tout le pays Cependant, le niveau socio-économique des familles a aussi une incidence

Les notes obtenues au Kidmed index des adolescents en France ont été comparées à celles des adolescents d'Espagne (Serra-Majem 2004 931–935), pays d'Europe occidentale proche de la France et où cet index a été élaboré Les différences sont significatives ($p < 0.005$) Les notes les plus basses sont obtenues par 4.2% d'Espagnols et 14% de Français Les notes les plus élevées sont obtenues par 46.4% d'Espagnols et 30% des Français Là encore, la région est très discriminante dans la distribution des résultats Les résultats du test d'adolescents français habitant en zone méditerranéenne seraient bien meilleurs

Le fait que les adolescents ayant un IMC élevé obtiennent de meilleurs scores est encourageant Ce fait montre une certaine connaissance des risques pour leur santé, et une prise en charge de leur alimentation Par contre, la baisse significative de la prévalence des bons scores avec l'augmentation de l'âge (45% vs 9%) est en relation avec les changements de comportements des adolescents Les plus jeunes prennent plus souvent leurs repas en famille ou en restauration scolaire Les adolescents plus âgés prennent plus fréquemment leurs repas hors du domicile ou de l'école, ou se retrouvent seuls à la maison au moment des repas lorsque les deux parents travaillent Ils adoptent alors un comportement "snacky", caractérisé par une consommation plus élevée en produits de pâtisserie industrielle, confiseries, préparations salées (pizzas, hamburgers) et boissons sucrées Ils préfèrent souvent aussi prendre leurs repas dans des restaurants de type "fast-food" avec leurs amis Ce phénomène, caractéristique de cette classe d'âge et lié au désir de marquer une forme d'indépendance vis-à-vis des adultes est compréhensible Un régime alimentaire relativement déséquilibré momentanément n'aura probablement pas de conséquence à long terme sur leur santé, si les mauvaises habitudes sont provisoires Le régime des adolescents est caractérisé par une prise excessive de sucres à absorption rapide et des apports sodés exagérés Les apports conseillés en sodium, pour une population sédentaire, sont d'environ 1 g de NaCl par jour (Apfelbaum et al 2004). L'excès de sodium est corrélé avec l'augmentation de l'hypertension artérielle chez les populations sensibles La consommation quotidienne des enfants et adolescents français est d'environ 6 g de NaCl (Volatier 2000) En Scandinavie, où les apports en sel ont été jugés excédentaires aussi, des

mesures ont été prises pour réduire la teneur en NaCl des aliments (Meneton 2002). Dans notre échantillon, 60% des adolescents (surtout les garçons) consomment aussi des boissons de type soda riches en sodium. Or (Vartanian 2007: 667–675), il existe une corrélation entre la consommation de sodas, les apports énergétiques et le poids corporel. De plus, la consommation de sodas est associée à une basse consommation de lait (calcium, en particulier), et avec une augmentation de risque de diabète et de fractures osseuses (Golden 2000: 542–543; Wyshak 2000: 610–613). Dans l'étude présente, comme dans les études nationales (LioRET et al. 2000), la consommation de produits laitiers relativement élevée chez les enfants français décroît progressivement durant l'adolescence.

Les principales sources alimentaires du rétinol étant les produits d'origine animale, les besoins sont généralement couverts dans cette population, alors qu'un grand nombre d'individus ont des déficiences en vitamine A dans la population générale (Le Grusse, Watier 2000; Hercberg et al. 1991: 245–261).

Huit pour cent des adolescents français ont une anémie ferriprive (Apfelbaum et al. 2004), phénomène rencontré surtout chez les jeunes filles chez qui se conjuguent la croissance corporelle et la survenue de la ménarche.

On peut dire pour conclure que cette étude est basée sur un échantillon représentatif de la population adolescente française (même taux de surpoids, même habitudes alimentaires et déséquilibres nutritionnels). Rappelons que ces adolescents ont travaillé pendant plusieurs mois dans leur collège, avec leur professeur de sciences de la vie, sur l'équilibre alimentaire et la santé. On attendait d'eux un meilleur comportement alimentaire. Or il existe un réel fossé entre leurs connaissances et leur comportement. C'est pourquoi les services publics se heurtent à un problème de compréhension: les informations, les formations nutritionnelles se multiplient dans les établissements scolaires, sans que la prévalence de surpoids diminue.

RÉFÉRENCES

- De Peretti, C , Castetbon, K 2004, *Surpoids et obésité chez les adolescents scolarisés en classe de troisième*, Direction de la recherche, des études, de l'évaluation et des statistiques (drees), n°283 p 1–7
- Centre of Disease Control (CDC) 2000, *Vital and Health Statistics of the Centre for Disease Control and Prevention/National Centre for Health Statistics (NCHS) Growth Charts United States*, n° 214
- Rolland-Cachera, M F , Cole, T J , Sempé, M , Tichet, J , Rossignol, C , Charraud, A 1991, *Body Mass Index variations centiles from birth to 87 years*, Eur J Clin Nutr , **45**, p 13–21
- Rolland-Cachera, M F , Deheeger, M , Bellisle, F 2001, *Définition actuelle et évolution de la fréquence de l'obésité chez l'enfant*, Cah Nutr Diét , **36** (2), p 108–112
- Himes, J H , Dietz, W H 1994, *Guidelines for overweight in adolescent preventive services Recommendations from an expert committee*, Am J Clin Nutr , **59**, p 307–316
- Barlow, S E , Dietz, W H 1998, *Obesity evaluation and treatment Expert committee recommendations*, Pediatrics, **102** (3), p 1–11

- Cole, T J , Bellizzi, M C , Flegal, K M , Dietz, W H 2000, *Establishing a standard definition for child overweight and obesity worldwide international survey*, BMJ, 320, p 1240–1243
- Serra-Majem, L , Ribas, L , Ngo, J , Ortega, R M , Garcia, A , Perez-Rodrigo, C , Aranceta, J 2004, *Food, youth and the Mediterranean diet in Spain Development of KIDMED, Mediterranean Diet Quality Index in children and adolescents*, Public Health Nutr , 7 (7), p 931–935
- Montero, P 2006, *Indicateurs de qualité de l'alimentation chez les enfants l'indice KIDMED*, Antropo , 11, p 189–197 <http://www.didac.es/antropo>
- Delafosse, B 1998, *Evaluation des besoins nutritionnels et des apports*, dans Cynober, L , Aussel, C (eds), *Exploration de l'état nutritionnel* Paris Editions Médicales Internationales, Tec & Doc , p 99–125
- Martin, A 2001, *Apports nutritionnels conseillés pour la population française*, 3^{ème} édition, Londres-Paris-New York, Tec & Doc
- Hercberg, S , Deheeger, M , Preziosi, P 2002, *Portions alimentaires manuel-photos pour l'estimation des quantités*, Paris SU VI MAX – Candia – Polytechnica
- Favier, J C , Ireland-Ripert, J , Toque, C , Feinberg, M 1995, *Repertoire général des aliments*, Table de composition, 2^{ème} édition, Londres-Paris-New York, Tec & Doc
- Feinberg, M 2001, *Regal Micro Répertoire general des aliments Logiciel pour Windows*, Paris, Inra Tec & Doc
- WHO Europe 2005, *La sante des enfants et des adolescents en Europe*, Aide-mémoire EURO/06/05, Copenhague et Bucarest, 12 septembre 2005
- Mathieson, A , Koller, T 2006, *Addressing the socioeconomic determinants of healthy eating habits and physical activity levels among adolescents*, WHO/HBSC, <http://www.euro.who.int/document/e89375.pdf?language=french>
- Basdevant, A , Ricquier, D 2003, *Pour une approche scientifique de l'obésité Annales de l'Institut Pasteur/actualités*, Paris, Amsterdam, New York, Oxford, Shannon, Tokyo Elsevier
- Wang, Y , Monteiro, C , Popkin, B M 2002, *Trends of obesity and underweight in older children and adolescents in the United States, Brazil, China and Russia*, Am J Clin Nutr , 75, p 971–977
- Poulain, J P 2002, *Manger aujourd'hui Attitudes, normes et pratiques*, Toulouse Privat
- Aranceta, J , Perez-Rodrigo, C , Ribas, L , Serra-Majem, L 2003, *Socio-demographic and lifestyle determinants of food patterns in Spanish children and adolescents the enkid study*, Eur J Clin Nutr , 57, p 40–44
- Apfelbaum, M , Romon, M , Dubus, M 2004, *Diététique et nutrition*, 6^{ème} édition Paris Masson
- Volatier, J L 2000, *Enquête INCA individuelle et nationale sur les consommations alimentaires*, Londres, Paris, New York, Tec & Doc
- Meneton, P 2000, *L'excès de sel*, Report INSERM (U 367) submitted in Afssa (Agence française de sécurité sanitaire des aliments)
- Vartanian, L R , Schwartz, M B , Brownell, K D 2007, *Effects of soft drinks consumption on nutrition and health a systematic review and meta-analysis*, AJPH, (97) 4, p 667–675
- Golden, N H 2000, *Osteoporosis prevention a pediatric challenge*, Arch Pediatr Adolesc Med , 154, p 542–543
- Wyshak, G 2000, *Teenaged girls, carbonated beverage consumption and bone fractures*, Arch Pediatr Adolesc Med , 154, p 610–613
- LioRET, S , Dubuisson, C , Gautier, A , Perrin-Escalon, H , Guilbert, P , Volatier, J L , Delamaire, C 2004, *Comparaison de deux enquêtes de consommation alimentaire auprès des adolescents et des adultes*, Baromètre santé nutrition (2002) et INCA (1998–99) éléments de méthode et résultats Report AFSSA-INPES
- Le Grusse, J , Watier, B 1993, *Les vitamines*, CEIV-Prodits Roches
- Hercberg, S , Preziosi, P , Galan, P , Deheeger, M , Papoz, Z , Dupin, H 1991, *Apports nutritionnels d'un échantillon représentatif de la population du Val-de-Marne III Les apports en minéraux et vitamines*, Rev Epid et Santé Publ , 39, p 245–261

NEW ASPECTS ON THE PATHOLOGY OF DERMATOGLYPHICS IN INFANTILE AUTISM

ANA ȚARCĂ, CONSTANTIN BARABOLSKI

The present paper resumes an older study (performed in 2003, on 137 subjects, 67 boys and 70 girls) – on a higher number of subjects – of the autistic syndrome from the perspective of dermatoglyphic pathology. In this new, improved version, the study analyzes 207 autists (104 boys and 103 girls) with ages between 2.5 and 18 years, all coming from Moldova, from whom 414 finger and palmar prints had been taken over. A first observation to be made is that the series of autists investigated in 2008 shows the same distortions or dermatoglyphic anomalies as that of 2003, the slight differences recorded, not exceeding 2%, occurring rather accidentally, and not as a result of sampling, the more so that both groups of affected patients maintain the same tendency of distribution of these distortions as a function of sex, laterality and on the 5 cumulated fingers, too, which is significantly different from the case of the reference.

Present in both boys and girls and on both hands of the affected subjects of both series, the distortions put into evidence in autists were also present in the patients with epilepsy and sekulary IEP-es investigated in 2002 and 2004 – which indicates a unitary dermatoglyphic behavior in brain affections. The explanation is that the encephalon comes from the same embryonal foil, “*the ectoblast*”, as the skin, so that any disorder produced at brain level has repercussions on the epidermal papillary ridges, as well. The results obtained, supporting the conclusions of the study on autism, contribute to a better knowledge of the indices of dermatoglyphic diagnosis of the autistic syndrome, to be further employed as “*markers*” for a timely discovery of the persons risking to be affected by such a severe malady, so extensively present in the Romanian population, in general, and in that of Moldova, especially.

INTRODUCTION

The dermatoglyphic study of infantile autism from a pathological perspective has been approached as early as 2003 when, thanks to the cooperation, established in 1991, with the Mental Health Center of the “Socola” University Clinical Hospital of Iași, the authors succeeded in dermatoglyphically investigating, out of the numerous subjects affected by various congenital and hereditary maladies, a total of 137 autists (67 boys and 70 girls); the material thus collected has been discussed in various published contributions (Țarcă 2003: 91–98; Țarcă *et al.* 2003: 11–17; Țarcă 2003: 187–199).

ANN ROUM ANTHROPOL, 45, P 93–100, BUCAREST, 2008

However, considering that infantile autism is a complex syndrome, characterized by a large range of neuropsychic and physiological disorders, occurring in various forms – from the mild, partially or totally recoverable (Bowman 1983: 261–265; Jordan *et al.* 1996; Opitz 1986: 27–37; Uta 1997: 37–183), up to the most severe ones (Meilă *et al.* 1988: 340–446; Schauman *et al.* 1976: 131–221; *** 1996) – for corroborating the conclusions reached, on one side, and for fully granting the results obtained, on the other, the authors extended the size of the group up to more than 100 persons for each sex, which assured the necessary degree of statistical representativeness and stability of the batch, comparatively with the apparently normal population of Moldova, from which it comes.

MATERIALS AND METHOD

Along several years, in the Mental Health Center of Iași, there have been dermatoglyphically investigated through finger and palmar printing, a total number of 207 autistic children (104 boys and 103 girls), all from Moldova, with ages between 2.5 and 18 years, from whom 414 finger and palmar prints had been taken over. The medical certificates of the patients, annually checked by the Examination Commission as to the degree of handicap, showed that, in 40.55% of the cases, the autism is associated with severe mental deficiency (SMD), with a QI value <34, with dyslexia, anxiety and double incontinence, in 51.25% of them the malady is accompanied by moderate mental deficiency (MMD), enuresis, hypoacusis and anxiety, while in the rest of 8.20% of them, besides (MMD) and enuresis, epilepsy was also present. Consequently, about 75% of the autists under analysis have been included by the MHC Examination Commission to a first order invalidity degree, a position assuming an advanced neuropsychic and physiological degeneration, suggestively correlated – as demonstrated in the following – with an ample pathological charge of their dermatoglyphic picture.

For all distortions or anomalies evidenced in the digital picture and investigated in the present study, there have been also considered some extremely important aspects for the evaluation, from this perspective, of the extent to which the sample group had been affected, namely: the sexual dimorphism, the bilateral differences and the succession of their distribution on the 5 cumulated fingers.

At the same time, the obtained results have been compared with those recorded in the apparently normal population of Moldova (Țarcă 1995: 171–217), the area from which the affected people come, with those registered in the 2003 (Țarcă *et al.* 2003: 11–17; Țarcă 2003: 187–199), series of autists, as well as with other two major brain affections – epilepsy and severe infantile encephalopathy, investigated in 2002 (Țarcă 2002: 28–34), and 2004 (Țarcă 2004: 109–119).

The working methods applied are those usually employed in studies of pathological dermatoglyphics (Cummins *et al.* 1961: 57–210; Loesch 1983: 315–331; Schauman *et al.* 1976: 131–221; Țarcă 1997: 29–40).

RESULTS AND DISCUSSION

Analysis of the data listed in Table 1 – presenting the main dermatoglyphic distortions evidenced in the 2 series of autists (of 2008 and 2003, respectively), assuming – at group level – deviations in the frequency of some digital characteristics from the values recorded in the apparently normal population from which they come, as well as overturning from the classical line of sexual dimorphism, of the bilateral differences and of their succession of distribution on the 5 cumulated fingers, put into evidence a quite similar dermatoglyphic behavior, some slight differences (not exceeding 2%) observed being accidental, rather than the result of sampling.

If considering first *the sensible increase, versus the normal, of the frequency for arches (A)* for all the 10 fingers, one may observe that the actual series of autists records values lower with only 1.1%, comparatively with the 2003 one. The clinical implications of this anomaly are even higher if adding to it that referring to an *intense diminution of the sexual differences, instead of the preponderant presence of this pattern in girls, comparatively with boys*, differences tending to higher A ratios in boys, along with *the reversion of positions 3 and 4 of the classical distribution scheme of A on fingers* (II>III>I>V>IV instead of II>III>V>I>IV), anomalies traced in both groups of autists. Equally, out of the total A present on finger I, most of them (3.43% in the 2008 series and 4.37%, respectively, in the 2003 one) have a radial orientation, which brings about severe medical consequences for their carriers (Bowman 1983: 261–265; Cummins et al. 1961: 57–210; Loesch 1983: 315–331; Schauman et al. 1976: 131–221).

An increasing frequency of A for both series of autists determined *a pronounced decrease of the one for the pattern of majority – the loops (L)*, up to 59.13% in the 2008 series and up to 60.44%, respectively, in the 2003 one, comparatively with 71%, the value recorded in the reference series of Moldova. Such severe anomaly, evidenced at populational level, is intensified – *in both cases – by the overturning of the classical line of the sexual dimorphism and of the bilateral differences in distribution L, a pattern more frequently occurring in boys instead of girls, and on the right hands instead of the left one* (Tables 1–2).

As to the whorls (W), occupying the second position – as to their frequency – after L, no significant differences appeared between the two series of autists, on one side, and the reference group, on the other, as to the percent values attained, yet *important deviations from the dimorphic and bilateral distribution tendency* may be noticed, *namely a slight prevalence of W in girls instead of boys*, on one side, *and a slight occurrence of the bilateral differences instead of their prevailing presence on the right hand of the affected people*.

As to the hierarchization of frequency W on the 5 cumulated fingers, the two series of autist, show the same succession, namely: IV>I>II>III>V, which differs in the reference group in terms of the last 3 positions of the classical scheme (IV>I>V>III>II).

An important malformative sketch present in the digital dermatoglyphic picture of the autists is the ***much increased incidence of the racketoid loops***, actually an extremely rare pattern in the apparently normal populations (Cummins et al. 1961: 57–210; Țarcă 1995: 171–217) and absent in the reference sample. In the 2008 series of autists, the racketoid loops attain an average percent value of 8.31%, the value recorded for the 2003 one being of 9.19%. Mention should be made of the fact that, according to Tables 1 and 2, this pattern appears in both series of autists, more frequently in the series of girls and on the right hands of the affected people, with the same distribution of succession on the 5 fingers (IV>V>II>III>I), as well.

A dermatoglyphic digital anomaly the malformative effects of which may be compared with those caused by the reversion of the normal position of the internal organs (Loesch 1983: 315–331; Schauman et al. 1976: 131–221; Țarcă 1997: 29–40), traced in both groups of autists (of 2008 and 2003), refers to ***the sensible increase of the weight for the radially of the digital structures, considered on their whole (A+L+W)***. In the actual series of autists, this distortion attains a mean frequency of 10.72% versus the value of 7.30% recorded in the 2003 series, in both cases, practically equal values being found out in both sexes, instead of a presence of majority in boys (as in the reference batch), and more frequently occurring on the left hand of the affected people of both sexes, instead of the right one – as in the normal ones (Cummins et al. 1961: 57–210; Țarcă 1995: 171–217).

A quite similar behavior is also to be observed in the two groups of autists in terms of the distribution on the 5 cumulated fingers of the radial orientation (II>IV>III>I>V in 2008 and II>III=IV>I>V in 2003), which agrees – this time – with that of the reference group.

The same digital distortions observed in autists have been also traced by the authors in other two major brain affections – i.e., epilepsy and infantile encephalopathies (Țarcă et al. 2002: 28–34; Țarcă 2004: 109–119), the percent values recorded as a function hand, sex and on the whole being listed in Table 2. According to the table, with only few exceptions, the variability in the frequency of distortions is quite limited from one group of affected subjects to another, which indicates quite unitary structural dermatoglyphic behavior of the three brain affections. In terms of sexual and bilateral differences, however, one may observe that the epileptics and the patients affected by secular IEP-es maintain to a higher extent the distribution tendencies of the reference batch (Țarcă et al. 2002: 28–34; Țarcă 2004: 109–119), unlike the autists from both series, in which such differences are either only weakly expressed or they appear reversed, comparatively with the normal cases.

A last digital anomaly put into evidence in both groups of autists, manifested in the case of both epileptics and encephalopathes, as well, refers to the ***hand or bilateral monomorphism and the individual monomorphism***, assuming the presence of the same pattern type (be it A, L or W) on all 5 fingers of one or another hand and, respectively, on all 10 fingers of a persons (Table 3). The data

provided in Table 3 show that, for all three types of monomorphism (left, right and individual), the highest frequencies recorded *versus* the reference occur in the group of patients suffering from secular IEP-es, in which the clinical spectrum of the malady's manifestation is one of the most complex ones (Țarcă 2004: 109–119), followed by the two series of autists and, on a last position, by epileptics (Țarcă *et al.* 2002: 28–34). In terms of the two sexes, the boys show higher percent values than the girls – in the case of the left hand, right hand (epileptics excepted) and individual (encephalopathes excepted) monomorphism. In the last mentioned form of monomorphism, the pathological significances of which are by far much more profound (Cummins *et al.* 1961: 57–210; Loesch 1983: 315–331; Schauman *et al.* 1976: 131–221), higher frequencies are recorded in the autist girls of the 2008 series, as well as in the girls suffering from epilepsy, in whom the disease takes more severe forms than in boys.

CONCLUSIONS

The dermatoglyphic study developed on patients suffering from infantile autism, resumed on an extended number of subjects (from 137 in 2003 to 207 in 2008), put into evidence a quite similar behavior in the two series of subjects, suggestively illustrated not only by the percent values registered for the observed dermatoglyphic distortions, the differences in which do not exceed 2%, but also by the maintenance of the sexual dimorphism line, of the bilateral differences and of the succession of distribution on the 5 cumulated fingers, both these peculiarities sensibly distancing the two groups from the reference batch of Moldova, from which both series of affected people come.

The fact that the same digital anomalies evidenced in autists are also occurring in patients suffering from epilepsy and secular IEP-es, in not much different ratios from one series to another, suggests once more that the causal factors involved in the three major brain affections, be them of either genetic or teratological nature, have been manifested – in all cases – in an early period of their prenatal life, that is, between the 3rd and 5th months of intrauterine development, when the epidermal papillary ridges – that had suffered important deviations from normality – got also finalized.

The distortions were present in both affected boys and girls, and on both hands of the patients of the two sexes, mention being nevertheless made of the fact that the sexual and bilateral differences are either weakly expressed or get reversed, comparatively with the normal, which amplifies the malformative effect of such anomalies.

As the conclusions of the 2003 study on autism have been confirmed by the one resumed in 2008, the authors consider that the dermatoglyphic distortions put into evidence will contribute to a better knowledge of the indices of dermatoglyphic diagnosis characteristic for this so largely occurring syndrome, to

be further employed as “*markers*” in the screening methods for a timely tracing of the malady at population level, as well as of the persons risking to be affected, for the application of some preventive therapies even prior to the manifestation of the first signs of the malady.

Table 1

Frequency of the digital anomalies and their distribution as a function of sex, hand and fingers in the 2008 and 2003 autists series, *versus* the reference batch

Digital anomalies	2008 and 2003 autists; reference	%	Sexual differences	Bilateral differences	Distribuțiun on fingers
A on total number of fingers	Autism 2008	9 22	$M \geq F$	$L > R$	$II > III > I > V > IV$
	Autism 2003	10 30	$M \geq F$	$L > R$	$II > III > I > V > IV$
	Reference	3.70	F > M	L > R	$II > III > V > I > IV$
L on total number of fingers	Autism 2008	59 13	$M > F$	$R \geq L$	$V > III > IV > I \geq II$
	Autism 2003	60 44	$M \geq F$	$R > L$	$V > III > II > IV > I$
	Reference	71.00	F > M	L > R	$V > III > II > I > IV$
W on total number of fingers	Autism 2008	31 59	$F > M$	$R \geq L$	$IV > I > II > III > V$
	Autism 2003	29 63	$F > M$	$R \geq L$	$IV = I > II > III > V$
	Reference	27.50	M > F	R > L	$IV > I > V > III > II$
Racketoid loops	Autism 2008	8 31	$F > M$	$R > L$	$IV > V > II > III > I$
	Autism 2003	9 19	$F > M$	$R \geq L$	$IV > V > II > III > I$
	Reference	-	-	-	-
Radiality of the digital structures	Autism 2008	10 72	$M \approx F$	$L > R$	$II > IV > III > I > V$
	Autism 2003	7 30	$F \approx M$	$L > R$	$II > III > IV > I > V$
	Reference	2.80	M > F	R > L	$II > III > IV > I > V$

Table 2

Percent distribution, according to hand and sex, of the digital anomalies, comparatively with other brain affections

Digital anomalies	Brain Affections	Boys			Girls			Total		
		L	R	L+R	L	R	L+R	L	R	L+R
A on total number of fingers	Autism 2008	11 73	6 92	9 33	10.60	7 57	9 13	11 21	7 25	9 22
	Autism 2003	13 43	7 76	10 60	12 87	7 06	10 00	13 13	7 44	10 30
	Epilepsy	11 20	13 60	12 40	16 80	12 00	14 40	14 00	12 80	13 40
	EPI	6.80	7 40	7 10	12 60	10 20	11 40	9 70	8 80	9 25
L on total number of fingers	Autism 2008	59 80	60 77	60 29	57 28	58 64	57 96	58 55	59 71	59 13
	Autism 2003	55 52	66 86	61 19	58 57	60 86	59 71	57 08	63 79	60 44
	Epilepsy	59 60	54 12	56 86	57 25	55 29	56 28	58 43	54 70	56 57
	EPI	60 00	52 20	56 10	59 00	61 00	60 00	59 50	56 60	58 05

(Table 2 continued)

W on total number of fingers	Autism 2008	28 46	32 31	30 38	32 03	33 59	32 81	30 24	32 94	31 60
	Autism 2003	28 66	29 25	28 95	28 57	32 00	30 28	28 61	30 15	29 63
	Epilepsy	27 84	34 12	30 59	27 45	32 55	30 00	27 64	33 33	30 49
	EPI	33 20	40 40	36 80	28 40	28 80	28 60	30 80	34 60	32 70
Racketoid loops	Autism 2008	7 50	7 69	7 59	8 74	9 32	9 03	8 11	8 50	8 31
	Autism 2003	8 35	8 95	8 65	9 43	10 00	9 71	8 90	9 45	9 19
	Epilepsy	5 88	7 45	6 66	7 05	6 27	6 66	6 47	6 86	6 66
	EPI	9 60	7 40	8 50	6 20	6 80	6 50	7 90	7 10	7 50
Radiality of the digital structures (A+L+W)	Autism 2008	11 92	9 61	10 77	11 45	9 90	10 68	11 69	9 76	10 72
	Autism 2003	10 14	3 90	7 01	8 85	6 60	7 71	9 48	5 25	7 30
	Epilepsy	9 40	16 86	13 10	13 30	9 80	11 60	11 40	13 30	12 30
	EPI	8 60	14 00	11 30	11 80	11 60	11 70	10 20	12 80	11 50

Table 3

Comparative data on the frequency of the hand (bilateral) and individual monomorphism differentiated on sex and on the whole

Afections	Boys			Girls			Boys + Girls		
	L	R	I	L	R	I	L	R	I
Autism 2008	23 67	25 00	8 65	23 30	22 33	11 65	23 19	23 67	10 14
Autism 2003	20 89	26 89	8 95	17 14	21 43	8 57	18 17	24 09	8 75
Epilepsy	25 49	11 76	3 92	19 60	19 60	7 84	22 55	15 68	5 88
IEP	32 00	27 00	14 00	23 00	23 00	10 00	27 50	25 00	12 00
Reference	15 00	9 00	3 00	14 00	8 00	2 50	14 50	8 50	2 75

I = individual

IEP = infantile encephalopathies (N = 200 100 B and 100 G) – A Țarcă 2004

Epilepsy N = 102 (51 B and 51 G) – A Țarcă 2002

Autism 2003 N = 137 (67 B and 70 G) – A Țarcă 2003

Autism 2008 N = 207 (104 B and 103 G)

REFERENCES

- Bowman, E P 1983, *Asperger's Syndrome and Autism*, British Journal of Psychiatry, **143**, p 261–265
- Cummins, H, Midlo, Ch 1961, *Finger Prints, Palm and Soles*, Dover Publ, Inc New York
- Jordan R, Powel, S 1996, *Understanding and Teaching Children with Autism*, John Wiley and Sons Ltd, England
- Loesch, D Z 1983, *Quantitative Dermatoglyphic, Classification, Genetics, and Pathology*, Oxford Univ Press
- Meilă, P, Milea, Șt 1988, *Tratat de pediatrie*, Ed Medicală, București

- Opitz, J , 1986, *Rett Syndrome Some Comments on Terminology and Diagnosis*, Am J Genet Suppl , **24**, p 27–37
- Popescu, O 1985, *Copilul și unele dintre bolile sale*, Edit Medicală, București
- Sank, D , Sank, B D 1979, *Finger Prints and Laterality Preferences of Early Onset Autism*, Birth Defects, Original Article Series, **XV** (6)
- Schauman, B , Alter M 1976, *Dermatoglyphics in Medical Disorders*, Springer-Verlag NewYork – Heidelberg – Berlin
- Țarcă, A 1995, *Structura dermatoglică a populației din trei provincii istorice românești*, teză de doctorat, Ed Al I Cuza”, Iași, p 171–217
- Țarcă, A 1997, *La signification clinique des dermatoglyphes*, Ann Roum D’Anthropol , **34**, p 29–40
- Țarcă, A , Barabolski, C 2002, *Contributions to the Dermatoglyphic Diagnosis of Epilepsy*, Journal of Preventive Medicine, **10** (2), p 28–34
- Țarcă, A 2003, *The Predictive Value of Dermatoglyphics in the Diagnosis of Infantile Autism*, Ann Roum D’Anthropol , **40**, p 91–98
- Țarcă, A , Barabolski C 2003, *Pathology of Dermatoglyphics in Infantile Autism*, Journal of Preventive Medicine, **11** (1), p 11–17
- Țarcă Ana 2003, *Contribuții la diagnoza dermatoglică a sindromului autist*, Memorile Secțiunilor Științifice ale Academiei Române, **XXVI**, p 187–199
- Țarcă Ana, 2004, *Utilisation of the Dermal Configurations in the Clinical Diagnosis of Sequelary Infantile Encephalopathies*, Ann Roum D’Anthropol , **41**, p 109–119
- Uta Frith, 1997, *Autism and Asperger Syndrome* Univ Press, Cambridge, p 37–183
- *** *Autism*, 1996, Webster’s New World-Medical Dictionary,
http /www.medterms.com/script/main/art.asp
- *** *Autism*, 1997, National Institute of Mental Health (NIMH), Washington,
http /www.focusonkidshealth.com/script/main/art.asp, p 1–27
- *** *International Classification of Diseases Diagnostic Criteria for Research*, 2002, World Health Organization (WHO), Geneva, http /www.focusonkidshealth.com/script/main/art.asp, p 270–278

“Fr I Rainer” Institute of Anthropology,
Iași Department, antropologieiasi@yahoo.com

OBSERVATIONS CONCERNANT LES DERMATOGLYPHES DIGITO-PALMAIRES CHEZ DEUX POPULATIONS DE L'OLTÉNIE

CORNELIU VULPE, ELEONORA LUCA, MONICA PETRESCU

Remarks on digital and palmary dermatoglyphes in two populations from Oltenia. The study of dermatoglyphes in the investigated populations adds new elements to existing data shown in "The Anthropological Atlas of Oltenia". Digital and palmary dermatoglyphes are explored and commented upon for 601 individuals of both sexes from the Castranova and Peștișani areas. Findings reveal coexisting convergent and divergent patterns in individuals from the two communities which account for structural population characteristics as well as for some variability trends. As a rule, the paper contributes data that corroborate the range of parameters common to Romanian populations.

La recherche des dermatoglyphes chez les populations d'Olténie a été abordée généralement dans l'Atlas anthropologique de l'Olténie (Milcu Șt.M., Dumitrescu H., 1968). La présentation seulement de quelques aspects de la structure dermatoglyphique de 9 communautés humaines comprises dans l'atlas nous permettent à réaliser rien qu'une image d'ensemble sur les types principaux de dessins papillaires. Le présent travail se réfère à deux localités d'entre ces 9 (une de colline – Peștișani et l'autre de plaine – Castranova) où chez leurs populations ont été faites de investigations élargies, tant pour les dermatoglyphes digitaux, que aussi pour les celles palmaires. Cette analyse, plus détaillée, vient à compléter les dates de l'atlas avec de nouveaux éléments dermatoglyphiques dont permettront des comparaisons plus de finesse par rapport aux autres localités situées en zones géographiques différentes. Pour souligner l'utilité de notre démarche, nous citons même les auteurs de l'atlas qui voient comme une possibilité prochaine la recherche des autres communautés humaines situées sur le territoire de cette province historique et ceux-ci y soulignent que les compléments évantuels sont bienvenus.

Le matériel d'étude concernant les dermatoglyphes digitaux-palmaires a été prélevés sur 601 sujets, dont 334 de Castranova (167 ♂ et 167 ♀), respectivement 267 de Peștișani (87 ♂ et 180 ♀).

ANN ROUM ANTHROPOL , 45, P 101–109, BUCAREST, 2008

RÉSULTATS

LES DERMATOGLYPHES DIGITAUX

En ce qui concerne le type du dessin (A, B, T), on constate une augmentation du nombre des boucles et des tourbillons chez la population de Castranova, pendant que les arcs sont plus fréquents chez la population de Peștișani et la différence entre localités sont en ce cas notables (4%). Tant chez les hommes que chez les femmes les boucles ulnaires sont plus nombreuses par rapport les celles radiales et en ce qui concerne les tourbillons à un seul centre se rencontrent dans un poids plus accru que les tourbillons à doubles centres (Tableau 1).

C'est le nombre plus augmenté d'arcs et de boucles chez les femmes et de tourbillons chez les hommes qui fait la différence entre les deux sexes.

Concernant les différences de côté on constate que la plus approche distribution par rapport au schème classique s'observe chez les hommes de Castranova, pendant que chez la série masculine de Peștișani s'enregistre des fréquences droit-gauche opposées au schème classique. Les femmes des deux localités se ressemblent tant par la répartition des arc et des boucles radiales, en conformité avec le schème classique, que tant par la distribution opposée au schème des boucles ulnaires et des tourbillons.

Différences par rapport les mains

	<u>Castranova</u>		<u>Peștișani</u>		<u>Schème classique</u>
	Hommes	Femmes	Hommes	Femmes	
A	$g \neq d$	$g > d$	$d \geq g$	$g > d$	$g > d$
Br	$d > g$	$d \geq g$	$g > d$	$g \neq d$	$d > g$
Bu	$g > d$	$d > g$	$d > g$	$d > g$	$g > d$
T	$d > g$	$g > d$	$g \geq d$	$g > d$	$d > g$

En comparant les dates dermatoglyphiques de localités Castranova et Peștișani avec les celles enregistrées dans le volum «Dermatoglifologia» (C.Țurui, 1971: 62) dans 4 départements d'Olténie on constate que les populations examinées par nous s'approchent généralement aux limites de la variabilité trouvées dans cette province historique.

	<u>A</u>		<u>B</u>		<u>T</u>		<u>Nº</u>	
	♂	♀	♂	♀	♂	♀	♂	♀
Dép. Dolj	3,3	8,5	60,5	66,8	36,2	24,7	1000	1000
Dép. Gorj	3,1	8,4	60,1	66,6	36,8	25,0	1000	1000
Dép. Mehedinți	3,7	8,2	59,4	67,4	36,9	24,4	1000	1000
Dép. Olt	3,2	7,8	60,7	67,1	36,1	25,1	1000	1000
Castranova	3,9	4,3	64,6	68,5	31,4	27,1	167	164
Peștișani	7,1	9,1	63,7	64,5	29,2	26,4	87	178

Tableau 1
Dermatoglyphes digitaux

Sexe	Main	Localité *		A	Br	Bu	ΣB	T	TS	ΣT	Nombre de doigts
Hommes	Droite	C	n	33	46	484	530	187	85	272	835
			%	3,9	5,5	58,0	63,5	22,4	10,2	32,6	
		P	n	32	17	264	281	81	41	122	435
			%	7,4	3,9	60,7	64,6	18,6	9,4	28,0	
	Gauche	C	n	33	37	512	549	170	83	253	835
			%	4,0	4,4	61,3	65,7	20,4	9,9	30,3	
		P	n	30	21	252	273	89	43	132	435
			%	6,9	4,8	57,9	62,7	20,4	9,9	30,3	
	Droite + Gauche	C	n	66	83	996	1079	357	168	525	1670
			%	3,9	5,0	59,6	64,6	21,3	10,1	31,4	
		P	n	62	38	516	554	170	84	254	870
			%	7,1	4,4	59,3	63,7	19,5	9,7	29,2	
Femmes	Droite	C	n	30	29	543	572	159	59	218	820
			%	3,6	3,5	66,2	69,7	19,4	7,2	26,6	
		P	n	90	31	532	563	157	80	237	890
			%	10,1	3,5	59,8	63,3	17,6	9,0	26,6	
	Gauche	C	n	41	27	525	552	139	88	227	820
			%	5,0	3,3	64,0	67,3	17,0	10,7	27,7	
		P	n	72	38	547	585	137	96	233	890
			%	8,1	4,3	61,4	65,7	15,4	10,8	26,2	
	Droite + Gauche	C	n	71	56	1068	1124	298	147	445	1640
			%	4,3	3,4	65,1	68,5	18,2	8,9	27,1	
		P	n	162	69	1079	1148	294	176	470	1780
			%	9,1	3,9	60,6	64,5	16,5	9,9	26,4	
Hommes + Femmes		C	n	136	146	2059	2205	655	314	969	3310
			%	4,1	4,4	62,2	66,6	19,8	9,5	29,3	
		P	n	215	109	1590	1699	477	259	736	2650
			%	8,1	4,1	60,0	64,1	18,0	9,8	27,8	

* C = Castranova; P = Peștișani

Les hommes de Peștișani font exception pour la fréquence augmentée des arcs et aussi les femmes de Castranova par le poids plus bas des arcs. Les séries masculines des deux localités ont un nombre plus accru de boucles et plus bas de tourbillons par rapport aux dates de C.Țurari. Ces différences on peut considerer à la cause de la variabilité existente d'une communauté à l'autre.

En ensemble, la configuration des dermatoglyphes digitaux se present ainsi dans les deux localités d'Olténie:

	<u>A</u>	<u>B</u>	<u>T</u>	<u>N_o</u>
Castranova:	4,1%	66,6%	29,3%	331 (♂+♀)
Peștișani:	8,1%	64,1%	27,8%	265 (♂+♀)

LES DERMATOGLYPHES PALMAIRES

En analysant les tracés des principales lignes palmaires (A, B, C, D) trouvées chez les deux populations on voit que par la fréquence de laquelle la ligne A se fini aux points 4 et 5, elle enregistre une tendance d'être plus accentuée transversale à la main droite sans égard à localité ou le sexe. Cette tendance plus accentuée sur ce côté est donnée aussi par la ligne D finie fréquemment au point 11 de la main droite chez les deux populations (Tableau 2).

Les tracés de la ligne A finis aux points 1, 2 et 3, indique une tendance plus accentuée vers la position plus oblique de cette ligne à la main gauche pour toutes les series. Concernant cet aspect, il y a cependant une légère différence entre les communautés par une position oblique plus accentuée à la main gauche chez la population de Castranova. Les points terminaux 7 et 8 des lignes B, C, D déterminent des traces en boucles plus nombreux à la main gauche pour les lignes C, D et plus nombreux à la main droite pour la ligne B. Les points de terminaison 9 et 10 sont plus fréquemment trouvés chez la main gauche, tant pour la ligne C que pour la ligne D.

En ce qui concerne la ligne C, les deux formes abortives (Cx et Co) ont un poids plus bas. Celles-ci sont visiblement plus augmentées à la main gauche indifféremment selon la localité et le sexe. La forme Cx est plus nombreuse chez les deux sexes par rapport la forme Co.

Par la représentation des points de terminaison des lignes principales D, C, B selon les trios formules de Wilder on peut observer que la formule 11-9-7 est prédominante par rapport les autres deux, 9-7-5 et 7-5-5. La prédominance de cette formule s'enregistre aussi en ce qui concerne la répartition selon le côté où la fréquence est plus augmentée chez la main droit par rapport à la main gauche, indifféremment selon la localité et le sexe. La présence de la ligne D dans la formule 11-9-7 par sa point de terminaison 11, confirme en plus, la tendance plus

accentuée vers la position transversale de celle-ci à la main droite. En échange, les formules 9-7-5 et 7-5-5 tendent prédominant à la main gauche, tant chez les hommes que chez les femmes indifféremment de localité (Tableau 3).

En ce qui concerne les dessins palmaires, la population de Castranova par rapport à la population de Peștișani a une fréquence plus accrue des dessins de la régions hypothénare et espaces interdigitaux II et IV et aussi par les poids plus bas de la structure dermatoglyphique dans la région thénare et dans l'espaces interdigital I.

La répartition des dessins selon le sexe indique chez les femmes un nombre augmenté des dessins dans la région hypothénare et l'espace interdigital IV tandis que chez les hommes les fréquences sont plus augmentées pour les espaces interdigitaux II et III.

En même temps, il y a quelques différences entre les mains représentées par le nombre plus augmenté des dessins dans la région thénare et l'espace interdigital IV à la main gauche et aussi par la fréquence plus grande des dessins dans les espaces interdigitaux II et III de la main droite chez les deux sexes (tableau 4).

L'ordre où se répartissent les fréquences des dessins dans les régions palmaires chez les deux populations et l'ordre habituel: esp.IV > esp.III > rég.hypoth. > rég.thén. + esp.I > esp.II.

Voilà les dates enregistrées chez les deux communautés:

	<u>H</u>	<u>T+I</u>	<u>II</u>	<u>III</u>	<u>IV</u>	<u>No. mains</u>
Castranova	30,7%	9,8%	5,0%	37,0%	52,4%	664
Peștișani	28,6%	14,8%	3,2%	38,6%	47,4%	334

Le triradius axial présent le plus accru poids pour la position proximale (t) et puis pour les positions combinées (tc). On suit distancé le nombre des positions médianes (t') et distales (t''). Particulièrement, selon le sexe, on constate plus de positions proximales chez les hommes et plus de positions combinées chez les femmes (Tableau 5). La position médiane tend vers une fréquence plus grande d'apparition chez les femmes et celle distale se répartit presque également chez les deux sexes.

Par rapport aux côtés on observe une augmentation du nombre de positions proximales chez la main gauche pour les deux sexes. En même temps on s'enregistre aussi une tendance d'amplification du nombre des positions combinées à la main droit chez la série masculine, tandis que chez la série féminine la fréquence plus augmentée des ces positions est évidente (Tableau 5).

La répartition du triradius axial selon la position c'est la suivante:

	<u>t</u>	<u>t'</u>	<u>t''</u>	<u>tc</u>	<u>No. mains</u>
Castranova	52,1%	14,1%	2,1%	31,7%	668
Peștișani	46,4%	14,1%	3,6%	35,9%	534

Tableau 2

Les terminaisons des lignes palmaires (en pour-cent) selon la main et le sexe chez la population de Castranova et de Peștișani

Terminaisons	Localité	Sexe	D			C			B			A		
			d	s	d+s	d	s	d+s	d	s	d+s	d	s	d+s
1,2,3	Castranova	♂										32,9	69,5	51,2
		♀										46,1	77,6	61,8
	Peștișani	♂										41,4	63,2	52,3
		♀										42,2	65,0	53,6
4	Castranova	♂										29,9	13,2	21,6
		♀										22,4	10,3	16,4
	Peștișani	♂										23,0	12,6	17,8
		♀										18,3	13,9	16,1
5,5"	Castranova	♂				4,8	15,6	10,2	40,1	63,5	50,0	37,1	17,3	27,2
		♀				7,9	20,0	13,9	39,4	60,6	50,0	31,5	12,1	21,8
	Peștișani	♂				10,3	13,8	12,1	32,2	64,4	48,3	35,6	24,1	29,9
		♀				11,7	21,7	16,7	44,4	65,0	54,7	39,4	21,1	30,3
6,7,8	Castranova	♂	4,8	15,6	10,2	26,3	34,7	30,5	59,9	36,5	50,0			
		♀	7,9	20,6	14,2	29,1	34,5	31,8	60,6	39,4	50,0			
	Peștișani	♂	10,3	14,9	12,6	18,4	29,9	24,1	67,8	35,6	51,7			
		♀	10,0	21,7	15,8	30,0	28,3	29,2	55,6	35,0	45,3			
9,10	Castranova	♂	34,1	47,9	41,0	52,7	19,8	36,2						
		♀	32,1	40,6	36,4	49,1	23,0	36,1						
	Peștișani	♂	21,8	37,9	29,9	60,9	24,1	42,5						
		♀	33,3	43,3	38,3	44,4	19,4	31,9						
11,12	Castranova	♂	61,1	36,5	48,8									
		♀	60,0	38,8	49,4									
	Peștișani	♂	67,8	47,1	57,5									
		♀	56,7	35,0	45,8									
X,λ	Castranova	♂				13,2	20,9	17,1						
		♀				7,9	16,9	12,4						
	Peștișani	♂				5,7	25,3	15,5						
		♀				7,8	18,3	13,0						

(cont. tableau 2)

0	Castranova	♂				3,0	9,0	6,0						
		♀				6,0	5,5	5,8						
	Peștișani	♂				4,6	6,9	5,7						
		♀				6,1	12,2	9,2						
Nombre des mains	Castranova	♂	167	167	334	167	167	334	167	167	334	167	167	334
		♀	165	165	330	165	165	330	165	165	330	165	165	330
	Peștișani	♂	87	87	174	87	87	174	87	87	174	87	87	174
		♀	180	180	360	180	180	360	180	180	360	180	180	360

Tableau 3

Formules de Wilder

Sexe	Main	Localite	11-9 7 11 \ 7 11 0 7		9 7-5 9 \ 5 9-0-5		7-5-5 7 \ 5 7 0-5		Autres formules		Nombre des mains
			n	%	n	%	n	%	n	%	
Hommes	Droite	Castranova	87	52,1	45	26,9	7	4,2	28	16,8	167
		Peștișani	56	64.4	17	19.5	9	10.3	5	5,7	87
	Gauche	Castranova	44	26,3	66	39,5	24	14,4	33	19,8	167
		Peștișani	32	36.8	26	29.9	12	13.8	17	19,5	87
	Droite + Gauche	Castranova	131	39,2	111	33,2	31	9,3	61	18,3	334
		Peștișani	88	50.6	43	24,7	21	12,1	22	12,6	174
Femmes	Droite	Castranova	87	52,7	44	26,7	13	7,9	21	12,7	165
		Peștișani	91	50,5	53	29,4	18	10,0	18	10,0	180
	Gauche	Castranova	45	27,3	56	33,9	34	20,6	30	18,2	165
		Peștișani	54	30,0	69	38,3	39	21,7	18	10,0	180
	Droite + Gauche	Castranova	132	40,0	100	30,3	47	14,2	51	15,5	330
		Peștișani	145	40,3	122	33,9	57	15,8	36	10,0	360
Hommes + Femmes		Castranova	263	39,6	211	31,8	78	11,7	112	16,9	664
		Peștișani	233	43,6	165	30,9	78	14,6	58	10,9	534

Tableau 4

Dermatoglyphes palmaires

Seve	Main	Localite	Regions				Espaces interdigitaux						Nombre des mains
			H		I+I		II		III		IV		
			n	%	n	%	n	%	n	%	n	%	
Hommes	d	Castranova	44	26,3	7	4,2	15	9,0	90	53,9	74	44,3	167
		Pestisani	23	26,4	8	9,2	4	4,6	53	60,9	29	33,3	87
	s	Castranova	39	23,3	24	14,4	7	4,2	33	19,8	97	58,1	167
		Pestisani	25	28,7	16	18,4	2	2,3	24	27,6	42	48,3	87
	d+	Castranova	83	24,8	31	9,3	22	6,6	123	36,8	171	51,2	334
		Pestisani	48	27,6	24	13,8	6	3,6	77	44,2	71	40,8	174
Femmes	d	Castranova	59	35,7	16	9,7	7	4,2	84	50,9	71	43,0	165
		Pestisani	54	30,0	19	10,6	7	3,9	86	47,8	79	43,9	180
	s	Castranova	62	37,6	18	10,9	4	2,4	39	23,6	106	64,2	165
		Pestisani	51	28,3	36	20,0	4	2,2	43	23,9	103	57,2	180
	d+	Castranova	121	36,7	34	10,3	11	3,3	123	37,3	177	53,6	330
		Pestisani	105	29,2	55	15,3	11	3,1	129	35,8	182	50,5	360
Hommes + Femmes		Castranova	204	30,7	65	9,8	33	5,0	246	37,0	348	52,4	664
		Pestisani	153	28,6	79	14,8	17	3,2	206	38,6	253	47,4	534

Tableau 5

Triradius auxiliaux

Sexe	Main	Localité	t		t'		t''		t ^{ic}		Nombre des mains
			n	%	n	%	n	%	n	%	
Hommes	Droite	Castranova	93	55,7	24	14,4	4	2,4	46	27,5	167
		Pestisani	46	52,9	10	11,5	3	3,4	28	32,2	87
	Gauche	Castranova	95	56,9	28	16,8	4	2,4	40	23,9	167
		Pestisani	49	56,3	6	6,9	2	2,3	30	34,5	87
	Droite + Gauche	Castranova	188	56,3	52	15,6	8	2,4	86	25,7	334
		Pestisani	95	54,6	16	9,2	5	2,9	58	33,3	174
Femmes	Droite	Castranova	79	47,3	20	12,0	3	1,8	65	38,9	167
		Pestisani	70	38,9	29	16,1	6	3,3	75	41,7	180
	Gauche	Castranova	81	48,5	22	13,2	3	1,8	61	36,5	167
		Pestisani	83	46,1	30	16,7	8	4,4	59	32,8	180
	Droite + Gauche	Castranova	160	47,9	42	12,6	6	1,8	126	37,7	334
		Pestisani	153	42,5	59	16,4	14	3,8	134	37,2	360
Hommes + Femmes		Castranova	348	52,1	94	14,1	14	2,1	212	31,7	668
		Pestisani	248	46,4	75	14,1	19	3,6	192	35,9	534

CONCLUSIONS

En analysant les dermatoglyphes de point de vue de dessin digital on constate qu'en ce qui concerne les boucles et les tourbillons, ceux-ci sont presque rapprochés chez les deux localités. C'est le nombre plus augmenté des arcs chez la population de Peștișani qui fait la différence par rapport à la population de Castranova. En contexte avec les valeurs enregistrées dans les départements de l'Olténie on peut affirmer que les fréquences trouvées chez les séries étudiées par nous se rapprochent de dates publiées par C. Țurai.

Le tracé des principales lignes palmaires a mis en évidence, semblable aussi en autres cas, une tendance plus accentuée vers la position transversale des lignes de la main droite, indifféremment de localité et sexe.

La population de Castranova est différente par rapport la population de Peștișani par tendance plus accentuée vers la position oblique des lignes de la main gauche.

Les dessins palmaires apparaissent plus fréquemment dans les régions thénare chez la série de Peștișani, tandis que chez l'échantillon de Castranova les dessins sont rencontrés plus fréquemment dans les espaces interdigitaux II et IV.

Le triradius axial, par la position médiane et distale rapprochent les deux populations mais les éloigne par le nombre augmenté des positions proximales à Castranova et par de positions combinées à Peștișani.

A la suite des dates exposées ci-dessus, on résulte des ressemblances par quelques traits dermatoglyphiques entre les habitants de Castranova et Peștișani mais ceux-ci sont différents par d'autres trait et ça met en évidence les caractéristique de group, de variabilité entre les populations. En même temps les dates obtenues par l'étude de ces deux communautés s'inscrivent entre les limites des paramètres habituels trouvés chez les populations roumaines.

BIBLIOGRAPHIE

- 1 Chamla M C , 1962, 1963, *La répartition géographique des crêtes papillaires digitales dans le monde, nouvel essai de synthèse*, L'Anthropol , **66** (5), p 526–541, **67** (1–2), p 1–47
- 2 Milcu Șt M, Dumitrescu H, 1968, *Atlasul antropologic al Olteniei*, Ed Academiei R S R , București
- 3 Milcu Șt M, Nicolăescu-Plopșor C S , Vulcănescu R , Ionescu M , 1972, *Atlasul complex "Porțile de Fier"*, Ed Academiei R S R , București
- 4 Țurai C, Leonida C I, 1971, *Dermatoglyphologia*, Ed Medicală, București
- 5 Vulpe C., 1967, *Observations comparatives sur les empreintes digitales, palmaires et plantaires de la population des villages de Șimon et de Moecu de Jos*, Ann Roum Anthropol , **4**, p 89–94
- 6 Vulpe C, Rudescu Al, 1968, *Contribution a l'étude des empreintes digitales, palmaires et plantaires chez la population de cinq villages de la zone du bassin supérieur du Teleajen*, Ann Roum Anthropol , **5**, p 81–97

*Institut d' Anthropologie «Francisc I Rainer»,
Bucarest, corneliu_vulpe@yahoo.com*

LE CERF VAINCU – CHASSE À COURRE ET NÉO-RURALITÉ EN BRETAGNE

LIVIU MĂNTESCU

Following the French rural sociological studies of the '80s and late '90s, this article is an attempt to enlarge the definition of neo-rurality in the French context, by analyzing the usages of landscape and natural resources among two different populations the locals and the newcomers. Hunting, mushroom gathering or sports and long walks in the woods are usages socially and culturally embedded, some of them, like the ventry, being strongly ritualized. Moreover, these usages are identity marks, commonly shared in the case of the local population, but individually assumed in the case of newcomers. As the neo-rural population reaches almost half of the total population studied, the traditional usages of hunting are re-questioned, and in return, the proprietors of the forest restrict more and more the access for the newcomers and tourists. Thus, the conflict is not simply between different usages but more between different representations of the natural environment. In capturing these social representations I applied the method of inquiry based on the use of photography in interviews.

INTRODUCTION

Cette étude essaye de redéfinir la néo-ruralité par rapport aux usages du milieu naturel. Dans cette première partie nous allons présenter très court les débats existant dans la littérature française, à côté de la méthodologie que nous avons utilisée dans notre recherche. La deuxième partie est consacrée à la description ethnographique qui forme la base de l'analyse qui y suit. Les conclusions appuient sur l'importance de la néo-ruralité aujourd'hui.

La question n'est pas récente en France, des études ayant été réalisées à partir des années '70. La signification du terme *néo-ruraux* n'a pas été toujours la même. Dans le travail de Léger et Hervieu de 1979, les *néo-ruraux* signifie une population révoltée, les enfants de mai '68, « *les immigrés de l'utopie en appelant à la terre, à la nature, à un monde rural magnifique par leur imagination, symbole d'harmonie, de solidarité et de communauté.* » (p. 9). Ce sont des *hippies* qui viennent s'installer dans les villages et qui se trouvent plus ou moins en conflit avec la population locale formée par des agriculteurs. Dans ce cas, « *l'intégration locale [...] fait partie des représentations que se font les néo-ruraux d'un enracinement durable dans la vie campagnarde. [...] Il faut 'se faire accepter' d'une collectivité*

locale en lui donnant les gages symboliques qui témoignent qu'on accepte les normes. » (ibidem, 103). Dans notre étude les néo-ruraux sont l'émulsion de la ville, une population qui vient de s'installer dans le milieu rural en apportant toutes les valeurs de la ville, et qui ne cherche pas à se faire accepter à tout prix. Les communautés locales ne sont plus formées essentiellement d'agriculteurs comme dans les années '70, ce sont des communautés en réduction démographique avec une identité en reconstruction. En revenant sur la question des valeurs de la campagne 20 ans plus tard, Bertrand Hervieu observe, dans une enquête au niveau national, que les valeurs sont renversées: à la ville le loisir et le travail, à la campagne la liberté et la beauté. Il observe aussi que *« en parallèle avec ce nouveau désir de campagne, les usages du territoire se modifient sensiblement. [...] Les sentiments nouveaux qui émergent, et qui sont souvent testés pendant les vacances, se retrouvent dans des choix privés, en particulier résidentiels »* (Hervieu et Viard, 2001:III).

Nous avons étudié le rencontre de ces populations en prenant comme support les représentations sociales sur le cadre naturel de la Forêt de Paimpont, et sur un des ses usages spécifiques, la chasse à courre. En relation avec le thème de la ruralité, Jean-Claude Chamboredon considère que les transformations récentes *« modes divers de dé-paysannisation et de dé-ruralisation, dissociation des paysans et des chasseurs »* (Chamboredon, 1982:234), conduisent à accroître les contradictions entre les usages sociaux du territoire parmi lesquels s'inscrire aussi la chasse. Dans la même direction, Michel Bozon observe que: *« le conflit dans les représentations sociales du droit de chasse renvoie aux oppositions internes à la société rurale, à la transformation des usages du territoire rural (en particulier à la nouvelle division des usages entre usages productifs et non productifs), à la transformation des relations du monde rural à la société urbaine »* (Bozon, 1982:338). Dans le premier cas, l'utilisation du territoire permet aux locaux de traduire leur autochtonie. Dans le second cas, la chasse permet à des non ruraux de manifester, de façon ostentatoire, leur domination sociale sur une terre et sur ceux qui l'habitent (à voir aussi Weber, 1982; Darbon, 1997). Chamboredon présente cette différence plutôt comme un rapprochement entre les deux mondes par rapport à un territoire auquel les gens sont attachées: *« la chasse est un des terrains où se projette la riche variété des modes de rattachement à une société villageoise; elle révèle un continuum des modes d'appartenance, nés des mouvements contraires d'émigration et d'urbanisation d'une part, de ruralisation partielle d'autre part. »* (Chamboredon, op.cit.:239).

Une autre idée récurrente dans les études consultées, est celle qui considère la chasse comme un usage qui contribue à la maintenance de l'identité rurale et locale. Selon Charles-Henry Pradelles de Latour (1982), dans un monde rural qui a rompu avec ses traditions ancrées dans le cycle agraire, la chasse est la seule activité locale qui permette aux résidents de s'appropriier le territoire et d'affirmer leur identité.

La recherche du terrain a eu lieu pendant deux mois, février et mars 2007, dans trois villages autour de la Forêt de Paimpont. Comme méthodes d'enquête, nous avons utilisé, à part d'entretien et observation, une méthode pas beaucoup explorée, l'entretien avec des photos, *photo elicitation*. Il s'agit de discuter sur les sujets de la recherche en montrant des photos qui ont été bien choisies avant, pour stimuler la discussion et pour dépasser le discours courant des acteurs. En partant des observations de la neuropsychologie, selon laquelle le cerveau analyse premièrement les stimuli visuels et après les autres, la méthode photo a l'avantage de détendre l'atmosphère de l'interview et d'activer la mémoire profonde des individus (Harper, 2002 ; Clark-Ibáñez, 2004). J'ai commencé par un échantillon de 31 personnes sur la population totale d'une commune, pour laquelle j'ai utilisé la liste électorale. Ensuite, j'ai formé quatre groupes prévus initialement pour sept personnes, afin de m'assurer que j'allais en avoir au moins quatre pour mon entretien. Dans le premier et le troisième groupe j'ai eu sept personnes, dans le deuxième et le quatrième, cinq. Au total, 24 personnes. J'ai invité chaque groupe à la mairie de Tréhorenteuc dans des jours différents, en faisant attention d'avoir toutes les catégories d'âge en chaque groupe. Une erreur importante, parce que les jeunes n'ont presque rien dit, pendant que les autres ont accaparé la discussion. Les photos que j'ai choisies sont de quatre catégories : premièrement, le paysage autour de Tréhorenteuc, où on trouve des points de repères pour l'identité locale (comme des moulins ou des arbres), en utilisant la terminologie de Maurice Halbwachs (1925). Ensuite, des photos avec des gens du village ou des villages voisins. Ces deux catégories de photos ont été encore partagées en deux : des photos d'époque (cartes postales, albums d'anniversaire), et d'aujourd'hui. Aucune photo n'a été prise par moi, j'ai utilisé que des photos prises par les gens eux-mêmes, ou par des professionnels dans le cas des photos d'époque.

La plus-value de notre étude se retrouve au niveau méthodologique, en utilisant une méthode innovatrice, et dans la redéfinition de la néo-ruralité, comme une catégorie de population qui ne correspond plus à « des marginaux » hippies, mais à une population parfaitement intégrée du point de vue social, qui est nombreuse, qui apporte les valeurs de la ville et qui ne s'intègre pas dans le monde rural qui en a trouvé. Enfin, les mutations sociales de la vie rurale s'expliquent pas seulement sur la dimension des mutations professionnelles (Mandras, 1967 ; Abdelmalek, 2004), mais aussi sur la dimension des changements dans les représentations et les usages du cadre naturel, parmi les quelles, dans notre cas, la chasse occupe le premier lieu.

LE SPECTACLE DE LA CHASSE DANS D'AUTRES FORÊTS

Peut-être que le fait qui m'a impressionné le plus dans cette recherche de terrain a été la chasse de cerf à courre. Pour un jeune sociologue en formation de mon âge, qui fait sa première recherche dans une autre culture que sa culture maternelle, en l'occurrence roumaine, l'impact a été, sans exagérer, colossal. J'ai

été profondément impressionné et touché par le rituel, par la richesse des détails, par la méticulosité des rôles et des gestes, par la diversité des attitudes qui tournent autour de cette manifestation sociale, sans doute, exceptionnelle, de ce «fait social total» (Pinçon et Pinçon-Charlot, 1993). Je parle de cela avant de passer à la description proprement dite pour signaler l'importance de cet usage de la forêt, mais aussi la difficulté dans laquelle je me trouve en ayant le risque de ne pas décrire fidèlement ce que j'ai vu et compris. Je vais donc essayer de décrire, tant que mon bagage linguistique me permettra, les étapes de ce rituel, et de détailler ce que j'ai compris. Pour bien structurer notre description nous allons répondre aux questions : qui, où, quand et comment fait-on la chasse à courre, et après, nous allons donner les éléments du rituel de cette manifestation.

Qui fait la chasse à courre dans la forêt de Paimpont?

Le massif forestier de Paimpont, ou Brocéliande, si on utilise le nom mythique-touristique, se situe à une quarantaine de kilomètres au sud-ouest de Rennes, en Bretagne. Il a une superficie globale d'environ 14000 ha, les étangs y compris, dont 7000 ha de forêt appartiennent aux «grands propriétaires», princepalement deux familles nobles, et *des landes* qui se trouvent surtout sur la partie nord-ouest de la forêt, qui appartient aux paysans. Les nobles chassent dans la forêt, les paysans sur les landes. Dans la chasse à courre se chasse que un seul animal, dans notre cas, le cerf.¹ Le massif forestier est parsemé de nombreuses clairières, qui sont des villages, ou des hameaux. Il y a une différence entre ceux qui chassent et ceux qui participent à la chasse. Ceux qui chassent sont *Les Boutons*, ils forment l'Equipage Rallye Bretagne. Parmi eux, il y a les Boutons qui montent et ceux qui ne montent pas à cheval en raison de vieillesse. Ils payent une cotisation au Maître d'Equipage pour entretenir les chiens et d'autres taxes aussi. Pour un Bouton qui ne monte pas à cheval la taxe est de 1700 euro par saison. Tous les boutons, même s'ils ne montent pas à cheval, ont une tenue qui se compose de : redingote bleu roi, chemise et cravate blanches, gilet bordeaux, culotte blanche². Le gilet et la cravate sont parés avec des galons de vénerie qui représentent une tête de sanglier³. Ce sont les boutons. Comme chaussures ils ont de grandes bottes noires. Parmi les boutons il y a deux personnages importants : le Maître d'Equipage, qui est l'un des propriétaires de la forêt, ici M. le Comte Georges de Jacquelin, et le Piqueur, le « maître des chiens » (une meute de 80 Anglo-Français Tricolores), M. Frédéric Grasland, dit « La Feuille ». Le Piqueur à la culotte bleue et pas blanche, c'est la seule différence de tenue parmi les boutons. Pour être un bouton il faut être recommandé par quelqu'un qui est membre d'équipage, autrement dit, le bouton, d'abord coûte cher, mais il est offert par l'équipage.

¹ Il y a d'autres types de chasse dans la forêt de Paimpont : les paysans chassent à battue, et il y a aussi des gens qui luent une partie de la forêt pour chasse privée à tire.

² « La Vénerie aujourd'hui » Editions de Bourfontaine, Paris 2005.

³ Cela parce que au début l'équipage ne chassé que le sanglier.

Deuxièmement, il faut dire que, parmi les 74 familles qui forment l'Équipage, 45 ont des titres de noblesse. Dans « La vénerie aujourd'hui », un livre qui regroupe les plus de 400 équipages de France, sont mentionnés seulement 29 familles avec la particule M, *monsieur*. On peut donc conclure que Rallye Bretagne a gardé son caractère noble.

Avec les boutons chassent aussi *Les Invités*, des personnes qui sont invitées à monter à cheval, les enfants des Boutons etc. Ils payent aussi, ou parfois c'est seulement un honneur. Les invités ont la redingote noire et ils n'ont pas de gilets. Parmi les invités il y aura des personnes qui leur offrent des boutons. Le bouton n'est jamais refusé.

Les Boutons et Les Invités forment donc l'équipage ayant le titre Rallye Bretagne. L'histoire de l'équipage fait aussi part de son identité, il est la suite des équipages qui chassent le loup et le sanglier dans la Région de Redon, depuis la Restauration. « *Le dernier loup de la forêt de Brocéliande a été chassé à courre* » me dit M. Hubert Chemin, qui a eu l'amabilité d'être deux fois mon guide à la chasse. À part les galons de vénerie il y a d'autres insignes qui particularisent l'Équipage et qui lui offrent une identité spéciale. Il y a un hymne *Les adieux à la forêt de Paimpont*, une devise *Bretagne*. J'ai demandé à M. Chemin que-ce que signifie la devise ? « *Nous, c'est Bretagne. C'est ça la devise. On fait partie de la Bretagne d'abord !* »

Du point de vue juridique, l'équipage est une association régie par la loi du 1^{er} juillet 1901 et le décret du 16 août 1901, ayant le titre EQUIPAGE de PAIMPONT – RALLYE BRETAGNE, qui a comme but « *de faciliter la pratique de la chasse aux chiens courants et de favoriser l'élevage du chien d'ordre* »⁴. Selon le statut, l'association est composée par des membres d'honneur (ceux qui ont rendu des services signalés à l'association, et ils sont dispensés de cotisation), et membres actifs, ceux qui ont pris l'engagement de verser annuellement une somme de 5000 Francs (approx. 760 euro). L'admission se fait de la manière suivante : « *pour faire partie de l'association, il faut être agréé par le bureau qui statue, lors de chacune de ses réunions, sur les demandes d'admission présentées* » (ibidem, article 5). La qualité de membre se perd par la démission ou par le décès.

On voit que le statut a une qualité purement formelle, même pas d'orientation. L'équipage Rallye de Bretagne a plutôt le caractère de club avec une forte identité légitimée par un héritage, avec des règles informelles strictes. Mais les règles sont pour l'intérieur et aussi pour l'extérieur, pour ceux qui regardent le spectacle de la chasse.

Les suiveurs sont les personnes qui ne chassent pas, mais qui suivent la chasse à vélo, en voiture, ou à pied, pour eux, tous les moyens sont bons. Même s'ils ont un cheval, ils n'ont pas le droit de suivre à cheval tant qu'ils ne sont ni invités, ni boutons. Parmi eux il y a des gens qui font cela pour le plaisir du sport,

⁴ Statuts de l'association, article 2

ou pour s'entraîner pour des compétitions comme est le cas d'un marathonien. La division des vélos est très bien représentée au niveau technique : des bons vélos tout-terrain, avec des freins à disque. Il y a d'autres moins bien équipés mais qui suivent la chasse comme ils peuvent. Les gens qui suivent en voiture sont des vieux boutons, qui ne peuvent pas monter à cheval non plus (même le maître d'équipage suit la chasse en voiture) ou des gens proches des familles des boutons qui ont suivi la chasse depuis très long temps mais qui ne sont jamais monté à cheval. Il faut avoir la permission de Maître d'Equipe pour suivre la chasse. Une autre différence entre les suiveurs et les participants à la chassée est que les suiveurs n'ont pas le cornne de chasse. Avec une tradition, les suiveurs sont très spécialisés pour organiser les étapes de la chasse, pour faire des prédictions sur l'endroit où la chasse se déroulera, et finalement pour faire le trajet de la bête chassée.

Parmi les suiveurs en voiture il y a aussi ceux que nous appelons *Les Bouffons*. Ce sont des gens qui ne sont ni des invités, ni, bien sûr, des boutons et qui ont à peu près la même tenue que les boutons, sans avoir le gilet, un bouton de cravate en métal ordinaire, étant très maniérés et courtois, avec un style excessivement aristocrate. Bref, ce sont les imitateurs des boutons, toujours à leur disposition avec des aides gratuites, avec des remarques sans objet, qui ont comme but final de gagner la bienveillance de recevoir l'invitation d'être un bouton. Un exemple d'acte gratuit : « *Aujourd'hui c'est le fils de Roger qui conduit la voiture de M. Jacquelin⁵, mais quand il est pas là, c'est moi qui conduis. Ah, oui!* », dit M. X avec une certaine fierté. Un dernier aspect très important avant de passer à la section suivante est une précision que M. Chemin m'a faite en ce qui concerne les suiveurs:

«...ils sont tous corrects, il ne faut pas qu'ils perturbent la chasse, donc ils se tiennent remarquablement bien. [...] Les gens d'équipage ont priorité partout à la chasse parce que ce sont eux en somme qui sont les patrons de la chasse. Donc, les autres, les suiveurs, laissent toujours un bouton passer devant eux, question de politesse. »

À cela nous voulons ajouter qu'ils se découvrent aussi quand ils passent pour la première fois de la journée à côté d'un bouton. Les jeunes boutons et les invités aussi se découvrent devant les dames ou les vieux boutons. Pour ma part, ne voulant pas m'encombrer de ces usages, j'ai laissé mon béret en voiture et je suis resté tête nue même si dehors il faisait froid.

Où, quand et comment on fait la chasse à courre ? La saison de chasse commence au 1er septembre et finit au 31 mars. L'équipage chasse tous les jeudis et les samedis. Il faut se rappeler que Rallye Bretagne chasse seulement au cerf, et un seul animal par jour. Les veneurs n'utilisent pas de fusil, et l'animal, après être fatigué par les chiens, « *il se rendre* », et il est dagué au couteau par un membre de l'équipage. Le spectacle est majestueux ! Il faut avoir beaucoup de courage pour dagué un cerf chassé avec un couteau qui a, approximativement 30 cm. Pendant la chasse, le moyen de communication est *la trompe de chasse*. Elle fait

⁵ Le Comte George Jacquelin, maître d'équipage; le *fils de Roger* est son neveu.

2 tours et demi autour du corps du chasseur, avec une longueur de 2m 16cm, et sa tonalité est en Mi bémol⁶. Il y a plusieurs fanfares : la fanfare quand on part à la chasse (quand les chevaux et les chiens sont partis) ; la fanfare quand on voit l'animal, la fanfare de circonstance ; quand on sort de la forêt, on sonne *Le Débouche* ; quand l'animal « prend de l'eau », on sonne *La Vague* d'eau ; on sonne de *Bien Aller* aussi. Après, chaque famille à sa fanfare, qui sonne à un moment précis de la journée. Après que le cerf soit pris, il est monté dans une voiture et l'équipage va *Au Pavillon*. C'est le pavillon de chasse de la famille Le Gualés de Mézaubran. Ici, quelques hommes qui font cela d'habitude, découpent l'animal en laissant la carcasse et les entrailles aux chiens. Les meilleurs morceaux de viande sont destinés aux paysans qui ont eu « des dégâts » sur leurs champs au cause du Equipage. Nous observons donc que le cerf appartient en fait aux chiens. Avant que les chiens sortent du camion pour dévorer la carcasse et les entrailles, un faux cerf est créé par le *Garde de la Forêt*, un autre personnage de ce rituel, qui recouvre les restes avec la peau de l'animal. Cependant, tous les membres d'équipage prennent ces lieux devant le public et ils commencent à souffler dans les trompes *Les adieux à la forêt de Paimpont*, l'hymne de l'équipage. Après, ils jouent chaque fanfare qui a marqué les moments de la journée de chasse : quand ils sont parti, quand ils ont vu l'animal etc., en mémorant les moments de la journée et comment le cerf a été pris seulement par les sons des cornes de chasse. A ce moment-là, les chiens sont libérés par le Piqueur et la Garde de la Forêt tire la peau. Le spectacle est majestueux et grotesque en même temps : il y a approximativement cinquante personnes qui regardent en silence, 15 personnes qui jouent les fanfares de la journée (seulement des Boutons), et, entre eux, une meute de chiens, qui n'ont pas été nourris depuis 2 jours, qui déchiquettent les restes d'un cerf. Je n'ai jamais vu les os ! Les fanfares jouant sont comme des chansons funéraires depuis le début de la chasse. Elles jouent maintenant en mémoire d'un cerf qui a capitulé.

Après les chiens se sont nourris, les membres d'équipage commencent à jouer les fanfares de chaque famille. C'est le membre de la famille qui commence, en découvrant sa tête d'abord, et après les autres commencent en tonalité avec lui. A ce moment là, se déroule le moment le plus important du rituel de chasse: *Les Honneurs!* Les honneurs signifient le sabot gauche du cerf, du pied d'avant, avec de la peau découpé jusqu'au genou. Elles sont mises sur la casquette du Piqueur et celui-ci avance doucement vers le public, après le Maître d'Equipage. Le Maître d'Equipage va choisir un participant à la chasse qui s'est distingué pendant la journée de chasse. Souvent, les honneurs sont donnés à un invité, et cette fois ç'a été le cas aussi: un chirurgien de Brest. Mais, M. Chemin est venu chez moi avec le sabot du pied droit pour me l'offrir comme souvenir, et parce que j'ai bien suivi tous les moments de la chasse. Cela va rester le plus beau, le plus émouvant et le plus précieux souvenir de ma recherche en Bretagne, et de mon séjour d'études en France.

⁶ Tandis que la corne de chasse que l'on retrouve dans les orchestres symphoniques est en Ré.

Maintenant il faut décrire en quelques mots que signifie **la forêt, ou les forêts, et leurs usages parmi la population néo-rurale**. Les usages les plus fréquents sont les balades et le ramassage des champignons. Même si le ramassage est interdit, en étant propriété privée, et les balades aussi pendant la période de chasse ou en dehors des chemins balisés, beaucoup des gens vont dans la forêt. Les gardes de la forêt ont une certaine bienveillance vers la population locale, et moins bienveillance pour la population néo-rurale. Et ça parce que les gardes sont aussi recrutés parmi les gens du coin qui connaissent très bien la forêt.

Les néo-ruraux sont les habitants venus s'installer dans les villages plus où moins récemment, pour des motifs diverses. Ils trouvent dans la forêt le calme, la paix, la nature perdue, l'histoire et les traces des ancêtres, ils viennent pour se retrouver eux-mêmes. Parmi eux, il y a une catégorie qui travaille à Rennes. Ici ils ont un avantage de plus, la forêt, et pas n'importe la quelle: la forêt de Brocéliande! Avec *les 4 voies* l'accès est tellement facile, un demi heure, de Rennes et ils ont l'avantage de vivre dans *la paix de la campagne*. Mais comment vivent-ils là, est-ce que ils sont intégrés, est-ce qu'ils veulent cela? La forêt est à côté de chez eux, mais pour y accéder ce n'est pas facile. Elle a ses règles, ses propriétaires, sa vie et pour accéder il faut la comprendre d'abord. Comment les néo-ruraux comprennent-ils la forêt et sa vie?

À un extrême on peut placer les habitants qui ont une approche touristique de la forêt. Dans *la forêt touristique* on retrouve les habitants qui travaillent en dehors de la commune, qui sont peu intéressés par leur milieu de résidence, et qui ont l'indicateur de fréquentation le moins élevé parmi la population néo-rurale.

Après, il y a des gens qui trouvent la forêt plus proche d'eux, la forêt qui les détend, ou, pour utiliser une expression d'une de nos interviewées, *la forêt comme un jardin*. Ici, on retrouve les habitants qui sont venus mais qui travaillent dans la commune, ou qui sont retraités, qui prennent le temps de visiter l'orée de la forêt, souvent avec leur chien, mais qui ne vont pas plus loin dans leur démarche. Ils connaissent la forêt à distance, ils n'ont pas encore des habitudes liées à la forêt. Dans cette catégorie on retrouve la majorité des contestataires de la chasse, soit la chasse paysanne, soit à tir ou à courre. C'est un monde inacceptable pour eux : « .. *ici il y a la chasse à courre, avec les chevaux - c'est une autre époque ! C'est un autre monde ! Sont des gens qui vivent... ils ne vivent pas leur époque.* » (A. 48 ans).

La forêt est découverte par une certaine partie de la population néo-rurale. Peu à peu, les gens forment des habitudes vis-à-vis de la forêt: «*avec mon cousin je faisais beaucoup de vélo dans la forêt. On essayait de découvrir progressivement toute la forêt en se baladant.*» (L. 31 ans). En découvrant la forêt, ces gens ont découvert aussi un nouveau sentiment, celui du besoin de la forêt.

Après avoir été découverte, la forêt se constitue dans un espace qui donne de réponses aux problèmes existentiels, qui aide à mieux comprendre le monde, qui offre des indices: elle devient *la forêt inspiration*. Avec cette nouvelle catégorie des représentations on touche aussi l'usage ésotérique. L'inspiration peut être

historique, mais pas tous les artistes qui sont installés autour de Brocéliande travaillent sur des thèmes comme la magie et le passé arthurien de la forêt. Néanmoins, tous partagent l'image « bizarre » de la forêt, pour eux « *il y a des choses dans la forêt* ».

ANALYSE

Pour la chasse, nous avons montré que la première variable qui influence la perception de cette pratique c'est l'appartenance ou la non appartenance à la population autochtone. Pendant toute la recherche nous n'avons pas rencontré un seul habitant «de souche» qui serait en désaccord avec la chasse. Pour la population autochtone, « *le gros est le gros, et le petit est le petit* » ou « *chacun son truc* ». Les locaux sont habitués à une distinction nette entre leurs modes de vie, avec leur type de chasse sur les landes, et la vie spectaculaire des nobles avec la pratique de chasse à courre.

Que ce soit la chasse à courre ou les battues, les néo-ruraux ont du mal à accepter ces pratiques. Ils viennent avec une représentation externe sur la chasse, avec des valeurs différentes qu'ils opposent aux valeurs du terroir. Ce n'est pas le cas d'avoir une intégration de la pratique de chasse dans la vie quotidienne parmi toutes les catégories des habitants comme Bernadette Bucher donne l'exemple de la Vendée (1982 ; 1995 : 249–272). La recherche de Bucher a été faite avant du exode citadin dans le rural qui a caractérisé la décennie neuf et le début des années 2000 jusqu'aujourd'hui. Pour la population de néo-ruraux de notre cas, leur propriété privée est sacrée, et rien ne doit perturber le confort pour lequel ils ont payé, et dans le quel ils investissent encore. Un des paysans a observé que son village (Paimpont) est devenu « *une banlieue rennaise* ». Les habitants « de souche » ressentent les valeurs urbaines que la nouvelle population apporte, ils ressentent la ville qui est tellement proche d'eux, et ils ne sont pas prêts à la recevoir. De l'autre côté, les néo-ruraux se comportent exactement comme notre paysan a dit, comme dans leur nouveau quartier. En décrivant ce processus d'extensionnalité et externalité de la ville, Zygmunt Bauman fait le commentaire suivant :

« ... ils font toute ce qui est en leur pouvoir pour déconnecter leur propre univers de celui de reste des habitants. [...] Ces ghettos volontaires ont tendance à devenir les avant-postes ou les garnisons de l'extraterritorialité. » (Bauman, 2006:97)

Des communes situées à 40 km de Rennes sont devenues 'des ghettos' pour une nouvelle population d'habitants qui n'ont aucun lien avec les villages, à part leur maison bien rénovée. Ceux-ci sont les néo-ruraux qui ne travaillent pas dans la commune. Les autres, qui ont trouvé des postes dans le village (comme à l'école, à la bibliothèque, à la mairie ou ils ont leur propre affaire) sont ceux qui font des pressions sur la communauté, pas pour être acceptés dans le cadre des règles

sociales de la communauté, comme ça a été le cas avec la génération des hippies de '68 décrite dans l'ouvrage de Léger et Hervieu, mais pour intégrer leurs propres valeurs dans la communauté. Un exemple, c'est la nouvelle salle de fête de Paimpont qui est en train de se construire. Le projet, fait par la municipalité, prévoit une salle simple, avec une cuisine et d'autres annexes, comme les salles des fêtes pour les bals d'époque. En observant le plan architectural on voit que les sorties de *back stage* manquent, que les fenêtres sont grandes, larges, que les sources électriques sont mal disposées. Comment on traduit cela ? Les architectes et la municipalité n'ont pas pensé à faire une salle polyvalente, où des nouvelles activités comme des concerts, des expos peuvent être organisées, mais une salle à l'ancienne, pour les bals et les mariages. La nouvelle population des habitants ne se retrouve pas dans ces activités, et ils ont commencé à faire pression pour « enrichir » le projet. Dans le conseil municipal il n'y a aucun nouvel habitant, que des habitants « de souche », par conséquent, la population autochtone garde bien ses privilèges. La connexion avec la vie politique locale est un indicateur pour l'intégration, comme il y avait le cas avec les enfants de '68, un indicateur pour la connexion sociale avec le milieu résidentiel. Aujourd'hui, la néo-ruralité est caractérisé d'un absentéisme politique local.

Nous avons vu dans la partie ethnographique que le fait de travailler dans la commune change l'attitude des nouveaux arrivants vers la communauté par rapport à ceux qui travaillent dehors de la commune, notamment à Rennes. Pas dans le sens où ils veulent s'adapter au cadre social qu'ils ont trouvé sur place, mais en adaptant le cadre à leurs besoins et à leurs valeurs citadines. Ensuite, ceux qui travaillent dans la commune sont ceux qui découvrent la forêt, les gens qui ont trouvé dans la forêt une passion, une passion qui se transforme dans un besoin. Mais le milieu écologique auquel ils se rapportent est créé d'après une nouvelle image de la forêt, d'après leur propre image de la forêt, indépendamment des représentations et des pratiques locales. Par conséquent, une nouvelle forêt se naît, une forêt qui est destinée à une consommation *esthétique* et pas à une consommation *pratique-économique*, comme c'est le cas pour la population locale. Cette conclusion vient de nous confirmer une hypothèse d'un article de Jean-Louis Fabiani:

« *Un sentiment diffus d'hostilité [...] est commun à tous les nouveaux usagers de la nature, qui définissent le cadre naturel comme un paysage destiné à la seule consommation esthétique.* » (1984: 183).

Tandis que les usages de la population autochtone sont un spectacle de la socialisation (Darbon, op. cit.), les usages parmi la population néo-rurale sont plus des usages solitaires, de réflexion individuelle, d'introspection. Ils sont 'protestants' – se construisent d'après l'interprétation libre de chacun de la forêt, et parfois protestataires – ils ont un caractère écologiste militant. La dimension sociale de leurs usages, ce qui fait que nous le considérons comme comportements sociaux, est la capacité d'héritage de ces pratiques dans le cadre familial, ou leur capacité d'être transmissibles parmi la population néo-rurale, par le processus de

mimétisme social. Les usages de la population autochtone ont un caractère 'd'agape', pas dans le sens religieux du terme, mais dans le sens social, dans le sens où ils sont partagés avec les autres. Ludovic Ginelli aperçoit dans son travail sur la chasse en Pyrénées :

« [Les chasses] *ont autant d'occasions de développer une sociabilité, au cours des battues elles-mêmes qui demandent une organisation, une concertation entre chasseurs, mais aussi avant, au relais des chasseurs, 'où le matin, il y en a toujours un qui prépare le café'* » (Ginelli 2004:38).

Le fait que la population de chasseurs a baissé (Landry 2000), mais que le nombre des équipages de vénerie a augmenté, avec 381 équipages en 1991 contre 154 en 1975, c'est la preuve que la chasse à courre est loin d'être un « archaïsme résiduel » (Pinçon et Pinçon-Charlot, 1993). Mais, la démocratisation de la vénerie aujourd'hui ne réside pas dans l'ouverture vers les classes moyennes des suiveurs fidèles, ni dans le nombre élevé des équipages de « *gentilshommes fesse-lièvres* » qui forment la petite vénerie⁷, comme Pinçon et Pinçon-Charlot décrivaient la situations 20 ans avant. La provocation réelle pour toutes les pratiques de chasse traditionnelle, mais encore plus pour la chasse à courre qui porte des significations politiques profonds, c'est le rapport avec la population néo-rurale.

CONCLUSIONS

Dans cet article nous avons montré quels sont les nouveaux coordonnés de la néo-ruralité par rapport aux usages de l'environnement. Notre exemple a été pris d'une petite région de la Bretagne continentale, autour de la forêt de Brocéliande, avec un de ses usages le plus spectaculaire – la chasse à courre. La vénerie et la néo-ruralité se constituent comme des tailles définitoires une pour l'autre, autrement dit, on ne peut pas définir la néo-ruralité sans rendre compte de ses usages du nouveau territoire et de rapport avec les usages enchâssés dans ce territoire. De l'autre côté, la démocratisation de la vénerie devient une métaphore-piège si on ne prend pas dans l'analyse la métamorphose du cadre social rural en ensemble. L'inversion des valeurs, à la ville le loisir et le travail, à la campagne la liberté et la beauté, qui a été signalé par l'analyse quantitative de Hervieu et Viard, ce n'est pas le résultat d'un changement dans les valeurs de ruraux, mais la voix de la néo-ruralité. Si on s'approche en regardant les usages du territoire où cette population vient d'habiter, cette voix est plutôt un bruit désarticulé. Les usages de la population néo-rurale sont des usages solitaires avec une dimension de la sociabilité beaucoup plus faible que les usages de la population locale. Dans notre cas, la Forêt Paimpont va abriter pour le temps à venir, à côté de la grandeur des

⁷ Des équipages qui font la chasse à courre sans chevaux, seulement avec des chiens pour le petit gibier

usages locaux, la solitude de ses nouveaux habitants. La croissance de la dimension sociale des usages liés à l'environnement parmi les néo-ruraux est la preuve d'un rural réinventé.

REMERCIEMENTS Je remercie professeurs Bernard Boene et Ali Abdelmalek, Université Rennes 2, mes collègues Ștefan Dorondel et Monica Vasile pour les conseils en rédigeant cet article

SOURCES BIBLIOGRAPHIQUES

- Abdelmalek, Ali Ait 2005, *Territoire et profession Essai sociologique sur les formes de constructions identitaires modernes*, EME, col Proximités-Sociologie, Paris
- Bauman, Z 2007, *Le présent liquide – peurs sociales et obsession sécuritaire*, Seuil, Paris
- Bozon, M 1982, Chasse, territoire, groupements de chasseurs *Études rurales*, vol 87–88, p 335–342
- Bucher, B 1982, Rites et stratégies d'adaptation La chasse à courre en bocage vendéen, *Études rurales*, 87–88, p 276–286
- Bucher, B 1995, *Descendants de Chouans – Histoire et culture populaire dans la Vendée contemporaine*, Editions de la Maison des sciences de l'homme, Paris
- Chamboredon, J C 1982, La diffusion de la chasse et la transformation des usages sociaux de l'espace rural *Études rurales*, vol 87–88, p 233–260
- Clark-Ibáñez, M 2004, Framing the Social World With Photo-Elicitation Interviews, *American Behavioral Scientist*, Vol 47, No 12, p 1507–1527
- Darbon, D 1997, *La crise de la chasse en France La fin d'un monde* L'Harmattan, Paris
- Fabiani, J-L 1984, L'opposition à la chasse et l'affrontement des représentations de la nature, *Actes de la recherche en sciences sociales*, n° 54
- Ginelli, L 2004, Des « chasses de plumes » aux « chasses de tous poils » représentations sociales des chasses d'hier et d'aujourd'hui dans les Pyrénées Le cas de Villelongue (Hautes-Pyrénées), Mémoire de Maîtrise, Université Victor Segalen Bordeaux II
- Halbwachs, M 1925, *Les cadres sociaux de la mémoire*, Felix Alcan, Paris
- Harper, D 2002, Talking about pictures a case of photo elicitation, *Visual Studies*, Vol 17, No 1
- Hervieu, B et Viard J 2001, *Au bonheur des campagnes*, Editions de l'Aube, Paris
- Landry, P 2000, Résultats nationaux et données sociologiques Faune sauvage, vol 251, p 8–17
- Latour, de C-H 1982, La passion de la chasse dans une commune cevenole, *Études rurales*, vol 87–88, p 322–334
- Léger, D et Hervieu, B 1979, *Le retour à la nature Au fond de la forêt, l'Etat* Seuil, Paris
- Mandras, H 1967, *La fin des paysans innovations et changements dans l'agriculture française*, Sédés, Paris
- Pinçon, M et Pinçon-Charlot, M 1993, *La chasse à courre Ses rites et ses enjeux*, Payot et Rivages, Paris
- Weber, F 1982, Gens du pays, émigrés, étrangers conflits autour d'une chasse en montagne, *Études rurales*, vol 87–88, p 287–294
- *** 2005, *La Vénérerie aujourd'hui*, Editions de Bourfontaine, Paris

«Francisc I Ramer»
Institute d'Anthropologie
Bucarest

Imprimat în România

NOTES FOR CONTRIBUTORS

L'ANNUAIRE ROUMAIN D'ANTHROPOLOGIE (ROMANIAN ANTHROPOLOGICAL YEAR-BOOK) publishes original papers of anthropology, such as: paleoanthropology, biomedical anthropology, social and cultural anthropology, and also from other domains about human life. The articles could be written in English, and German.

Manuscript style. Page setup: top = 3 cm; bottom = 1.5 cm; left = 3 cm; right = 1.5 cm. Article's title has to be with font of 14 bold, centered and in capitals. The authors' names will be written with font of 12, centered and in capitals. Each text has to contain an abstract of 10 rows (font of 12, on line spacing 2). The article itself has to be with line spacing 2, Times New Roman, font of 12 justify. The titles of figures will be centered. At the bottom of the first page (font of 10, capitals and the number of volume in bold) ANN. ROUM. ANTHROPOL., 48, P., BUCAREST, 2008.

The references: the authors will be written with font of 12, title of the paper in italic, and the volume in bold. Next after this has to be the date of delivering the article and the institution, in italic. The running title will be written separately, with at least 600 letters (including spaces).

Reference style. The references should appear in the text with the name of the author, year of the publishing and page in brackets (Popescu 1999: 43); when the same author published more articles in the same year: (Popescu 2001a: 88), (Popescu 2001b: 67); when there are three or more authors: (Popescu *et al.* 2002: 56). All the references must be complete and accurate. The references will be published in this style:

Olivier G., 1960, *Pratique anthropologique*, Vigot Frere, Paris (for books).

Bell B., Budowle B., Martinez Jarreta B., Casalod Y., Abecia E., Castellano M., 1997, *Distribution of types for six PCR – based loci in central Pyrennee and Teruel (Spain)*, J. Forensic. Sci., 42 (3), p. 510–513 (for articles).

Illustrations. The photos (in jpg format) and graphics will be on separate pages, with the text centered and font of 12. Please supply original photos because copies of the published papers will not be accepted.

Further information. For other information and announcements you can write to Mr. Andrei Soficaru asoficau@yahoo.com.

Each article will be read by a specialist who will suggest its publishing or not. The calendar of the next number will be announced by e-mail.